THE IRON AGE

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Simplified Lathe Adapted to Shell Work

Flexibility Given the Gisholt 16 and 25 in. Simplified Lathes by Varied Equipment Made Up of Special Yet Standardized Parts

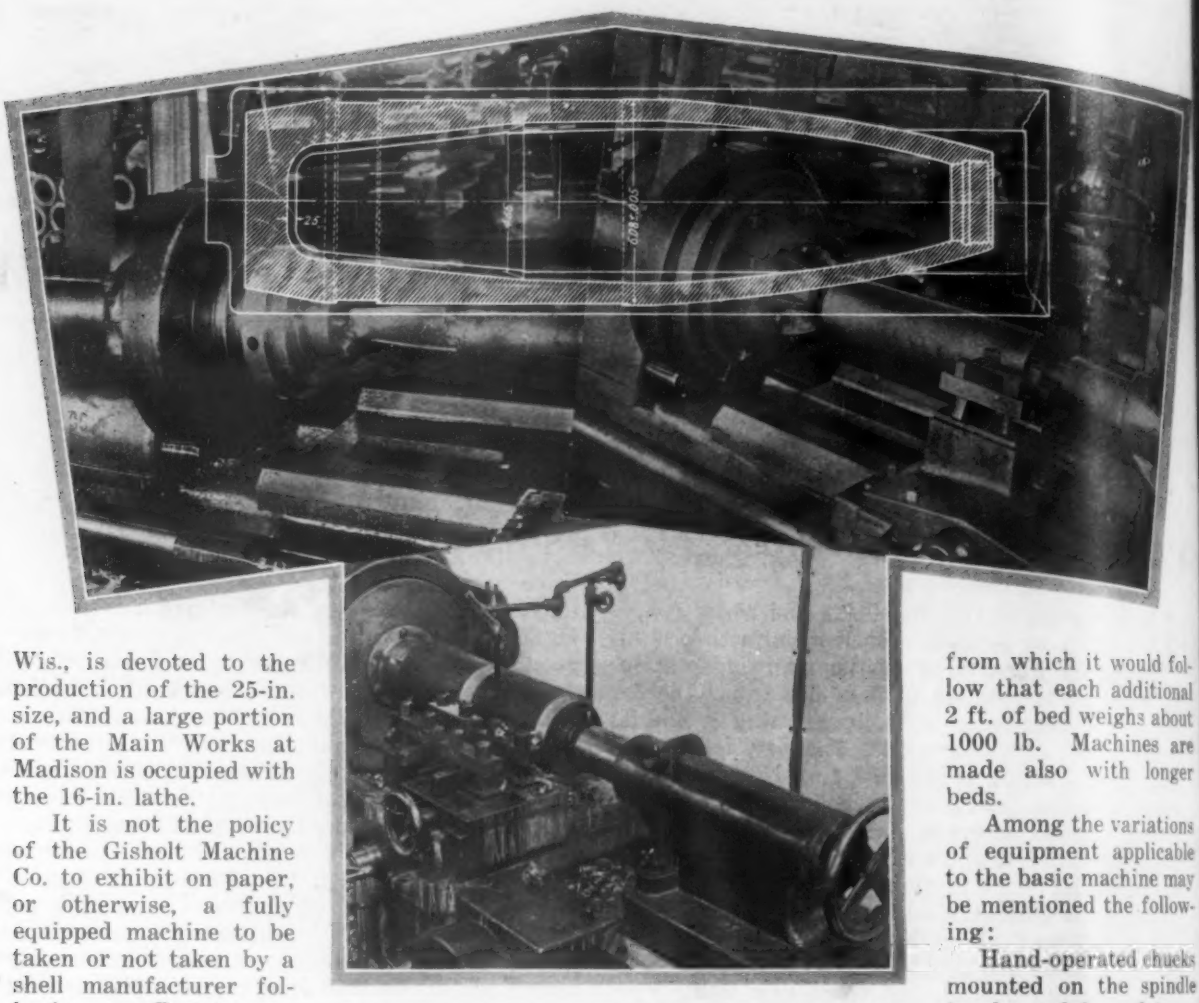
IN the design of the Gisholt 16 and 25-in. simplified lathes as applied to shell manufacture is afforded an illustration of the many adaptations by which it is possible to fit a basic machine for numerous operations, virtually creating a special machine for each operation. The new lathe, considered as a whole, is the result of evolution, inasmuch as it was developed to meet the requirements of many manufacturers, each of whose problems had been analyzed, and designs made and tested for the particular work in view.

Since the Gisholt Machine Co. entered the business of making shell machinery thousands of lathes have been made and delivered, a large percentage of the total going abroad, and these new lathes may be said to be the culmination of them all.

An interesting side light on the subject is that when the officials of the company were first approached to induce them to make special lathes they declined to make the machines in conformance with the drawings submitted. After some consideration they submitted designs of their own which were immediately accepted, and they were requested to go ahead, the initial order being for 400 lathes.

In a sense, the new lathe, whether arranged for boring, turning or other operations, is special. Yet in respect to its manufacture and the interchangeability of its parts it is not special, in view of the fact that the parts which enter its several modifications have been standardized and reduced to a manufacturing basis, this being made possible by the large number of each lot which go through the factory at one time. One each of the 16-in. and the 25-in. lathes was built, then the machine was jigged so that its commercial production came within reasonable bounds as to cost and a manufacturing quantity production was possible. This is true not only of the basic portion of the machine but of the accessory parts used in the rapid performance of the several operations necessary in making a shell. At present the entire capacity of the Northern Works of the company at Madison,

The Gisholt 25-In. Simplified Lathe in Use for Rough Turning in an American Munitions Factory. In this shop practically all the machines are operated by women and satisfactory results are obtained



The Lathe in Use for Boring and Turning. In this group a close-up view of the tool rest and driving mandrel of the turning lathe is presented, as well as one of the lathe arranged for the boring operation with the boring head just about to enter the shell. Rough turning a steel shell with two cutting tools, one of which can be operated independently, is also shown. In this case a test was being made, each tool with a 1/16-in. feed just cleaning up one side of the shell and removing ⅝ in. from the other

Wis., is devoted to the production of the 25-in. size, and a large portion of the Main Works at Madison is occupied with the 16-in. lathe.

It is not the policy of the Gisholt Machine Co. to exhibit on paper, or otherwise, a fully equipped machine to be taken or not taken by a shell manufacturer following an effort to convince him that it will do the specific work he wants done. The contractor's problem is made one for engineering study, it being considered that foremost in the prospective user's mind is not so much the medium by which the work is to be done as the satisfactory execution of the work itself. He usually has his own ideas as to the method he desires to pursue, this having been arrived at presumably after adequate investigation.

If his plan is reasonable, the main thought of the Gisholt engineers is not to make him accept any series of operations other than those he had contemplated, or any radically different methods, but by suitable selection and arrangement of the necessary attachments and tools, to accommodate the basic Gisholt lathe to the work and program he has in mind. This procedure has worked out successfully. Women are now operating machines so conceived and are giving entire satisfaction. The illustrations herewith show the 25-in. machine; similar equipment is furnished with the 16-in. size also.

In Fig. 1 is shown the basic machine, so to call the bed, headstock and parts always essential, no matter for what operation the machine may be arranged to perform. It consists of a 10-ft. or 14-ft. bed, a 16 to 1 headstock, friction pulley, face plate, oil pans and pump. The spindle has a bore of 6¼ in. With the machine is included a tight-and-loose-pulley countershaft. The weight of the lathe is approximately 10,000 lb. with a 10-ft. bed, this weight being modified, of course, by the equipment that is put on it. With a 14-ft. bed the machine weighs approximately 12,000 lb. fully equipped from which it would follow that each additional 2 ft. of bed weighs about 1000 lb. Machines are made also with longer beds.

Among the variations of equipment applicable to the basic machine may be mentioned the following:

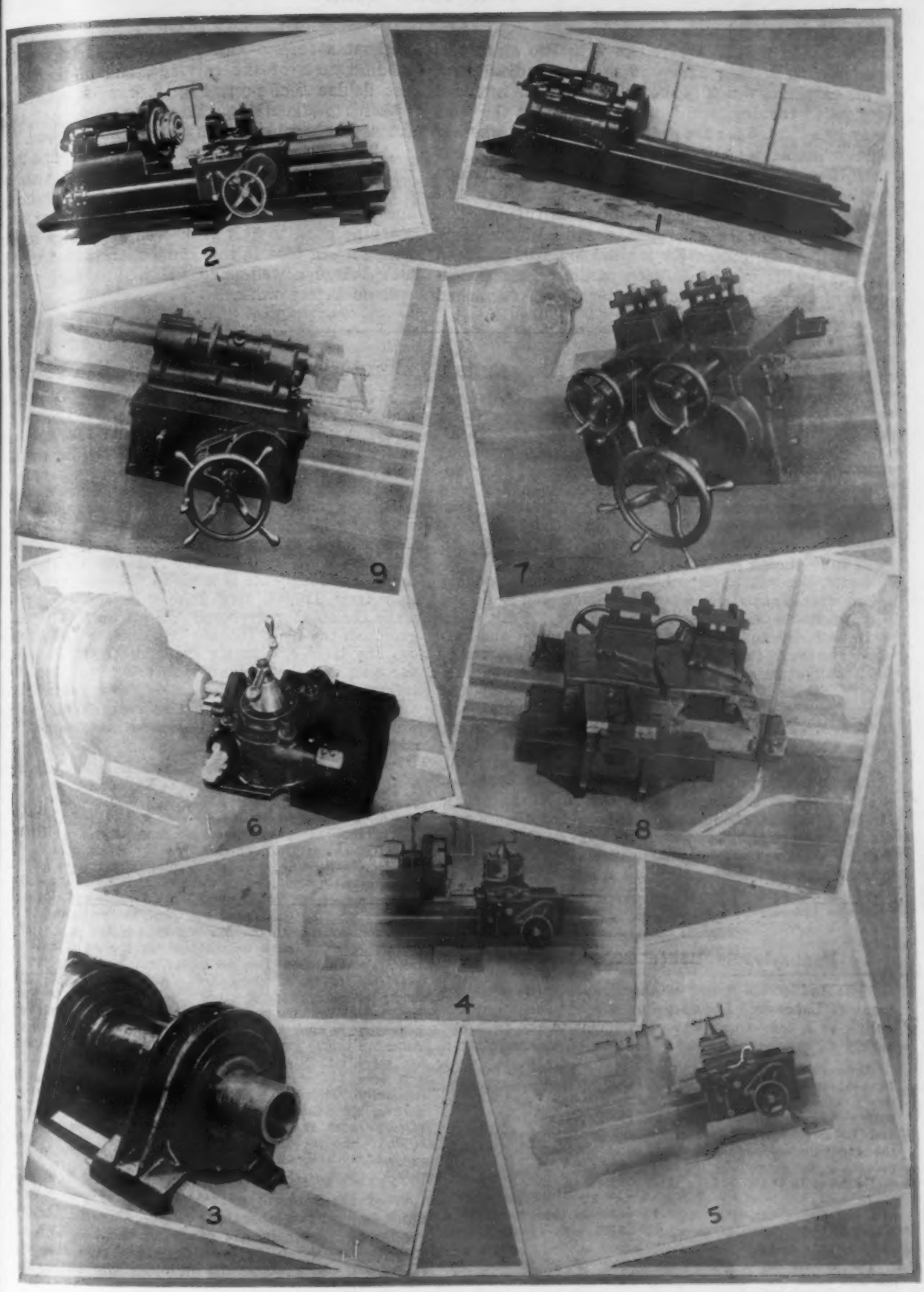
Hand-operated chucks mounted on the spindle in place of face plate, as shown in Figs. 2 and 3. Fig. 2 shows a hand-operated chuck accommodating work up to 6 in. in diameter.

When it is desired to hold shells up to 6 in. in diameter in an air-operated chuck, and to locate the shell and chuck within the spindle, this is provided for by enlarging the front of the spindle bore to 8⅜ in. in diameter for a sufficient length to accommodate both the chuck and shell within the spindle, carrying the load entirely in the front spindle bearing. This eliminates the necessity of a steady rest and pot chuck, simplifies the equipment and shortens the length of the bed.

Fig. 3 shows an air-operated collet chuck and steady rest for work up to 12 in. in diameter. An important point is that the pot chuck shown runs in an adjustable bearing in the steady rest which provides an easy method for adjustment in case of wear in the bearing between the steady rest and the chuck. This equipment gives a machine suitable for boring shells up to 8 in. in diameter, and may be used to advantage for base facing, grooving, nose boring and threading on shells up to 12 in. in diameter. A three-jawed geared scroll chuck can be used as shown in Fig. 4.

The carriage can be provided with a standard hexagon turret mounted on the cross slide, as illustrated in Fig. 4, with a four-sided tool rest mounted on the cross slide, with a four-sided tool rest mounted on right-angle compound cross slide, as shown in Fig. 5, and with a four-sided tool rest mounted to receive tools with round instead of square shanks, as brought out in Fig. 6.

A strap type of tool rest, or two rests, one having independent adjustment, can be furnished for the



THE GISHOLT 25-IN. SIMPLIFIED LATHE

Fig. 1—The basic part of the machine, whose variations of chucking and carriage arrangement give versatility to its operations. It may be equipped with one or more tool rests, a pillow block for the boring bar, a forming attachment, tailstock, etc. It has a 16 to 1 gear ratio in the headstock, a 6¼-in. hole in the spindle and a 10-ft. bed. Fig. 2—The machine equipped with a hand-operated collet chuck which can be mounted directly on the spindle nose close to the headstock in place of the face plate. It will accommodate work up to 6 in. in diameter. The carriage with a pillow block support for the boring bar and center locking pin also form a part of the equipment. Fig. 3—Another type of hand-operated collet chuck for work up to 9 in. in diameter. Due to the large size of the bore the chuck, which is shown holding a shell, is mounted in a steady rest. This type of chuck can also be furnished for work up to 12 in. in diameter. Fig. 4—The carriage is equipped with a hexagon turret mounted on the cross slide, and the headstock is provided with a three-jaw geared scroll chuck. Fig. 5—The carriage with a four-sided turret tool rest is mounted on a right-angle compound cross slide. Fig. 6—The carriage with a four-sided tool rest built up to receive the tools with round instead of square shanks. The carriage is identical with that shown in Fig. 5, the only difference being that the tool shanks in the other view are square. The tool post is shown with the tools in position for work. Fig. 7—A carriage for doing finish turning with two-strap type tool rests, each having independent hand cross movement. Fig. 8—The forming attachment which is furnished without a former block can be supplied on the carriage as shown in Figs. 2, 4, 5, 6 and 7. When this forming attachment is furnished for a carriage with the double type of tool slides shown, it is designed so that it may be attached to either of the slides, an important feature, as it permits the forming of the point of a shell with the small end near the face plate or with it near the tailstock. Fig. 9—Boring carriage with solid pillow block support and hand longitudinal feed on the boring bar in addition to the regular longitudinal feed. The picture shows the boring carriage equipped with an air cylinder for holding the boring tool in place and for removing it from the bar. The air equipment is not regularly included with this carriage.

carriage, as well as a carriage with two strap tool rests, each having independent hand adjustment. This carriage, which is shown in Fig. 7, is intended for finish turning, and is designed so that the tools may be adjusted for the proper depth of cut, whether one or both tools are removed for sharpening.

A forming attachment, Fig. 8, and a carriage with a pillow block support for boring bar and center locking pin, Fig. 9, can also be furnished.

The boring carriage, with a solid pillow block support, is equipped with a hand longitudinal feed on the boring bar in addition to the regular longitudinal feed. The forming attachment, furnished without a former block, can be used with various modifications of the carriage, and in the case of the double tool post, Fig. 8, can be attached to either rest, enabling the nose of the shell to be formed at the headstock or the tailstock end.

All of the machines and parts are given a finish quite comparable with the regular Gisholt standard, a factor which imposes no great cost, and maintains the reputation of the company for turning out a machine good to look at as well as of high serviceability. An idea in this connection is that an operator before a well-made and well-finished machine will do better work.

New Ordnance Department Assistants

WASHINGTON, Oct. 15.—The Ordnance Department has added W. W. Coleman and T. H. Symington to its staff of "special assistants to the Chief of Ordnance." Mr. Coleman will have charge of all matters connected with the production of cannon, carriages and their appurtenances and accessories. Mr. Coleman has been president of the Bucyrus Co., South Milwaukee, Wis. He has been with the production division of the Ordnance Department since last spring. Mr. Symington will have charge of artillery ammunition, metal components, but will have nothing to do with the loading plant operations. He is of the Symington-Anderson Co., Rochester, N. Y. It will be the duty of Mr. Coleman to follow up the manufacture of cannon and carriages through the stages of design, plant procurement and contracts, production progress inspection and supply. Similarly, Mr. Symington will follow up the manufacture of artillery ammunition.

The special assistants previously announced were: Brig. Gen. Guy E. Tripp, in charge of all district offices; W. H. Marshall, assistant at large; Lieut. Col. Ralph Crews, in charge of matters pertaining to the interpretation of contracts; Lieut. Col. W. C. Spruance, Jr., in charge of chemicals, explosives, propellants and loading, except small arms loading; Lieut. Col. Bascom Little, in charge of equipment, automatic arms, rifles, pistols, etc., and their ammunition, appurtenances and accessories; and L. J. Horowitz, in charge of tanks, tractors, trailers and similar articles.

Pennsylvania Boiler Rules Modified

The Industrial Board of the Pennsylvania Department of Labor and Industry has adopted the following ruling as a temporary war amendment to the code for safety of construction and operation of steam boilers:

Until further notice in this emergency, steam boilers not Pennsylvania standard may be installed and operated in this Commonwealth, provided the prospective purchaser or user makes a written request to the Department of Labor and Industry setting forth therein information concerning the construction and history of such boilers as becomes necessary to determine the safe working steam pressure and subject to the following rules:

In new construction of boilers not Pennsylvania standard, the factor of safety shall be not less than five. This factor of safety shall be increased 0.5 each five years thereafter.

For second hand boilers the factor of safety shall be not less than 5.5. This factor shall be increased 0.5 each five years thereafter.

When the chemical and physical properties of materials in the shell plate are not known, the tensile strength shall be assumed at not more than 50,000 lb. for steel plates and 40,000 lb. for iron plates. All such boilers shall be inspected and tested prior to operation by an inspector duly qualified by the Pennsylvania Department of Labor and Industry.

The National Tube Co., Pittsburgh, continues to add to its property holdings in the vicinity of its works at Dravosburg. Following its purchase of 30 acres, the company has acquired 17 additional acres from the Pittsburgh Coal Co., as well as 20 lots, on Washington Road. The company's purchases now aggregate 51 acres, costing about $366,000.

Domestic Iron Ore for Canadian Furnaces

TORONTO, ONT., Oct. 12.—The shortage of basic material for Canadian iron and steel industries, due to the partial embargo by the United States on exports to the Dominion and to the great demand for materials on war account, has turned attention anew to Canadian iron mining. High prices and the scarcity of pig iron may make it profitable to develop on a large scale the magnetite deposits which are abundant in Canada, particularly in Ontario. An example is the Atikokan mine, west of Lake Superior, where a large tonnage of magnetite is in sight. The average metallic iron from 110,000 tons shipped was 59.95 per cent while the sulphur averaged 2.38 per cent. With waste gas from the blast furnace this ore was roasted without any trouble, bringing the iron content up to 60.25 per cent, and the sulphur down to 0.48 per cent. This information is supplied by J. Dix Fraser, general manager of the Atikokan Iron Co., Port Arthur, Ont., a well-known mining engineer and metallurgist. He adds:

From this roasted ore we made some 40,000 tons of pig iron, 57 per cent of which ran below 0.03 per cent in sulphur, 36 per cent between 0.03 and 0.05 per cent sulphur, and 6.5 per cent from 0.06 per cent to 0.11 per cent sulphur, the balance being a white iron containing a high sulphur made under special contract for brake shoe work. This pig iron was shipped to all leading stove, pipe, gray iron and malleable foundries in Canada, giving splendid satisfaction. In fact our company did not receive one single complaint about the quality of the iron during the time I have been connected with it. We never used any other iron ore to mix with Atikokan roasted ore for the production of pig iron, always using 100 per cent Atikokan. We did, however, use 25 lb. of manganese ore per ton of pig iron to bring the manganese up from 0.35 per cent to 0.50 per cent for special foundry work. While this is helpful it is not necessary in running the furnace. What I have said about Atikokan ore is also true of other Ontario ores. Magnetites are more refractory and harder to smelt than hematite or soft ores, but there is no difficulty in treating them commercially. It takes a little more coke to reduce the magnetites, but after all it is a matter of cost, and no person familiar with the development of the magnetite mining in Norway and Sweden would say that these ores cannot be successfully treated in blast furnaces.

The electric furnace which is regarded as the solution of the problem of treating Ontario ores is not much beyond the laboratory stage. Canadian iron and steel manufacturers are studying the possibilities of Canadian iron mining, and Canadian ores may prove the solution of some of the problems confronting them.

The Birmingham Steel Corporation, Birmingham, Ala., is planning to start operations Feb. 1, in its new steel fabricating plant now in course of erection at Fifth Avenue and Thirty-fifth Street. The works will be devoted to the production of material for the building of steel vessels at the plant of the Mobile Shipbuilding Co., Mobile, with which it is affiliated. The Mobile company has a contract for the construction of 12 steel steamers, each of 5000 tons capacity, taken over from the Jahncke Shipbuilding Co., New Orleans, La., for the Government. Keels for two of the vessels have been laid. The shipyard will also build about 30 composite vessels, half steel and half wood. Henry Leon Brittain is president of both companies.

ALIEN STOCK SEIZED

Plotting of Germans in Connection with Bridgeport Projectile Co. Exposed

A. Mitchell Palmer, Alien Enemy Property Custodian, has announced the seizure by the United States of all but 100 of the 20,000 shares of the capital stock of the Bridgeport Projectile Co., Bridgeport, Conn., owned by the German Government, but now reorganized as the Liberty Ordnance Co., and operating three shifts a day on munitions for the United States Government. In making the announcement, Mr. Palmer said he had discovered that it was this company which German propagandists had attempted to use to prevent the manufacture and shipment of arms and ammunitions to the Allies. According to Mr. Palmer these propagandists, headed by Count von Bernstorff, had undertaken to prevent these shipments by creating an American corporation, apparently dominated and controlled by loyal American citizens, ostensibly for the purpose of engaging in the manufacture of munitions on an enormous scale. The real purpose was to hamper and hinder, if not to prevent altogether, other American manufacturers from making munitions for what Germany then considered to be the probable duration of the war. It was planned to have this corporation buy up all the available supplies of powder, antimony, hydraulic presses and other supplies and materials essential to the manufacture of munitions. The plan also involved the negotiation of contracts with the Allied Governments to supply them with materials of war, apparently in good faith, but in reality with no intention of fulfilling them. The ultimate expenditure of approximately $10,000,000 for this purpose was contemplated.

German Money Provided

Francis P. Garvan, director of the Bureau of Investigation of Mr. Palmer's office, found that the German Government had furnished the money with which the Bridgeport Projectile Co. had acquired its land, erected its factory buildings and fully equipped the factories with machinery and certain materials; that the company had made a contract with the German agents not to sell any munitions to any country with which Germany was at war; that the company contracted for the entire output of powder of the Aetna Explosives Co., Inc., of Jan. 1, 1916, for which approximately $5,000,000 was expended. These powder contracts were canceled, and the funds advanced were returned to Germany. He also found that the company had contracted to manufacture for Germany 2,000,000 shrapnel cases, the obvious purpose of which was to furnish a plausible excuse for its purchase of powder, presses, etc.; and that the company was in turn protected by guarantee of the Guaranty Trust Co. that it would meet its drafts properly signed to the extent of $5,000,000.

In addition to von Bernstorff, Dr. Albert, Dr. Dernburg and Captain von Papen, Carl Heynen, one time an American consul in Mexico, but then the associate of Dr. Albert and representative of the German Central Purchasing Agency, and Hans Tauscher, husband of Madame Gadski, and the American representative of Krupp, Mauser and other German munition manufacturers, were members of the coterie of plotters. Heynen is now interned as a dangerous alien.

All of them had been associated in a systematic and widespread campaign in this country to prevent the manufacture and shipment of munitions to the Allies. By skillful propaganda and intrigue, and the instigation of strikes and other labor troubles in the munition plants, with their attendant acts of violence, they sought to create a sentiment in this country in favor of an embargo on the shipment of munitions. The increasing hostility in the minds of the American people toward the German Government caused the collapse of this propaganda.

The Bridgeport Projectile Co. was incorporated under the laws of the State of Connecticut in 1915 by George W. Hoadley, an American citizen of Bridgeport. He had no financial resources, but the German Government financed the enterprise. The purpose of the company was stated in the corporation papers to be the manufacture and sale of ordnance and ammunition and the purchase and sale of materials from which munitions were made.

Chinese Market for American Machinery

The present situation in China as regards machinery is more a question of supply than of demand, says a report just issued by the Bureau of Foreign and Domestic Commerce, Washington. China, emerging from internal dissensions economically rejuvenated compared with the destruction of wealth going on in Europe, has found the usual sources of supply practically closed by the war. With silver worth more than ever known, the people would be anxious and willing to buy were not the same low exchange price in gold for their exports a deterrent. Everywhere abroad the home markets are being considered first; and if ships are found for what is left, it is carefully parceled out. The result of these conditions has been the industrial awakening of China and a determined effort to supply some needs at home with the consequent expansion of Chinese domestic industries. The necessity that has driven the Chinese to look to home manufactures to replace imports no longer available has been the mother of invention in more lines than one, and hardly any field of manufacture has been left untouched or untried. Among the new ventures noted during 1917 are pumping, mining and printing concerns, flour and rice mills, cotton weaving and silk filatures, oil and paper mills, brick and cement works, candle and soap factories, glassware and porcelain industries, electric lighting and waterworks, chemical manufactories, sugar refineries and factories for making surgical instruments, heating apparatus, electric light bulbs, bicycles, imitation panama hats, motors, printing presses, needles and nails, clocks, tiles, carpets, canvas and leatherware. Many other factories have been started in a small way and in every case there is the primary need of machinery.

The report says:

"There have been two well recognized methods of securing machinery contracts in China in the past. The first method is that of appointing one of the large mercantile houses having branches at all the important Chinese trade centers, as general agents on a fixed agreement for a term of years. This was the system employed by almost all the large German manufacturers and its principal advantage lies in the benefits accruing from an old established connection on the ground with valuable Chinese connections. (A list of such agencies is on file at the Bureau's district offices for use of interested parties.) In addition to such agency it has been found advisable to send one or more qualified engineers trained at the home factory, who could use the offices and staff of the agents' branches in China on their trips of inspection and co-operate with the agents' salesmen in obtaining business. The other and less desirable method for those just entering the Chinese field is to conduct the business direct with the Chinese, and open offices at four or five of the trade centers, with qualified engineers attached, who are competent not only to draw up specifications and quotations on the spot but to carry on negotiations with Chinese officials and purchasers.

"There are, of course, any number of variations from these two general methods, but as a rule the first method is by far the more desirable for those new to the field, as the peculiar conditions of Chinese trade have nothing in common with conditions in this country or in other foreign countries."

The National Founders' Association will hold its twenty-second annual convention at the Hotel Astor, New York, Nov. 13 and 14. As usual the administrative council of the association will meet the day before and on the evening of that day will be held the dinner of the alumni, composed of members of former administrative councils. The usual convention banquet will be held on Wednesday evening, Nov. 13.

New Schedules of Extras on Iron Bars

Bases Fixed for Common Merchant Iron and Refined Iron at $3.50 and $5 Respectively Per 100 Pounds—Most Extras Cut One-Half

An announcement has been made this week by Chairman E. H. Gary of the Committee on Steel and Steel Products, American Iron and Steel Institute, of prices and extras effective Oct. 17, 1918, on iron bars. The base on common merchant iron is fixed at $3.50 per 100 lb., which has been the bar iron base, and that on refined iron is fixed at $5 per 100 lb. In the schedules displaced by this announcement no separate base price was provided for refined iron. For the most part the extras just announced are only half those which have been published but the practice of the trade has been to charge only half extras and thus the full extras hereafter to obtain involve no difference. A feature of the new schedules is the large number of sizes of common merchant iron which take the refined iron price. The committee's announcement is in detail as follows:

The committee has received a report from the sub-committee on steel distribution based on information received from representative manufacturers of iron bars making certain recommendations which seem necessary to insure uniformity in respect of prices of various grades of iron bars and the application of extras thereto, and from such report and other data available the committee has concluded that the following changes and modifications in respect of its recommendations dated Nov. 13, 1917, and May 21, 1918, on iron bars are fair and reasonable and recommends that new maximum prices and extras as shown hereafter be adopted immediately.

Cancel pages 62, 63 and 64 of the Institute pamphlet of August, 1918, and substitute therefor the following:

Iron Bars

Base prices recommended by the Committee on Steel and Steel Products of the American Iron and Steel Institute, Oct. 17, 1918:

Price for base sizes per 100 lb. Common Merchant Iron..$3.50
Price for base sizes per 100 lb. Refined Iron..... 5.00

Subject to the extras for size, quantity, etc., shown below. Established custom as regards delivery point to govern.

Rounds and squares ½ in. and smaller, and all rounds and squares over 1⅞ in. are graded as Refined Iron.

Light bands, as per National List, are graded as Refined Iron.

Sizes above base sizes in flats are graded as Refined Iron.

Flats from 1 in. to 4 in. wide, by ¼ in. to 1 in. thick inclusive are graded as Common Merchant Iron; smaller flats are graded as Refined Iron.

Hexagons, ovals, half ovals, half rounds, and fender, round edge and round edge tire irons are graded as Refined Iron.

"Common Merchant Iron" is the term applied to material made from all scrap.

"Refined Iron" is the term applied to material made from puddle bar and selected wrought scrap.

Above prices do not apply to specifications or test irons, which are subject to negotiation.

Rounds and Squares

	Per 100 Lb.
1 to 1⅞	Base
2 to 2⅞	$0.10 extra
3 to 3½	.25 extra
3⅝ to 4	.40 extra
4⅛ to 4½	.50 extra
4⅝ to 5	.65 extra
5⅛ to 6	.90 extra
6⅛ to 6½	1.10 extra
6⅝ to 7¼	1.25 extra
¾ to ⅞	.05 extra
⅝ to 11/16	.10 extra
½ to 9/16	.15 extra
7/16 to 15/32	.20 extra
⅜ to 13/32	.25 extra
5/16 to 11/32	.35 extra
¼ to 9/32	.45 extra
7/32	.70 extra
3/16	1.25 extra

Heavy Band Iron

	Per 100 Lb.
8¼ to 10 x ¼ to 5/16	$0.35 extra
7 to 8 x ¼ to 5/16	.35 extra
6¼ to 6¾ x ¼ to 5/16	.25 extra
4¼ to 6 x ¼ to 5/16	.15 extra
1½ to 4 x ¼ to 5/16	.10 extra
1 to 1⅜ x ¼ to 5/16	.15 extra
¾ to 15/16 x ⅛ to 5/16	.25 extra
⅝ to 11/16 x ¼ to 5/16	.40 extra
½ to 9/16 x ¼ to 5/16	.50 extra
⅜ to 7/16 x ¼ to 5/16	.75 extra

Heavy bands, 7/32 in. thick, 5c. per 100 lb. higher than ¼ to 5/16 thick. Bevel edge shaft iron, 5c. higher than same size of heavy bands.

Flats

	Per 100 Lb.
1½ to 4 x ⅜ to 1	Base
4¼ to 6 x ⅜ to 1	$0.05 extra
4¼ to 6 x 1 1/16 to 1½	.20 extra
6¼ to 8 x ⅜ to 1	.30 extra
6¼ to 8 x 1 1/16 to 1½	.30 extra
8¼ to 10 x ⅜ to 1	.40 extra
1⅜ to 4 x 1⅛ to 1½	.15 extra
2 to 4 x 1⅝ to 2	.25 extra
4¼ to 6 x 1⅝ to 2	.30 extra
6¼ to 8 x 1⅝ to 2	.40 extra
8¼ to 10 x 1 1/16 to 1½	.45 extra
8¼ to 10 x 1⅝ to 2	.50 extra
2 to 4 x 2⅛ to 3	.30 extra
4¼ to 6 x 2⅛ to 3	.40 extra
6¼ to 8 x 2⅛ to 3	.50 extra
1⅛ to 1⅜ x ⅝ to 1	.05 extra
1 to 1 1/16 x ⅜ to ⅞	.10 extra
¾ to 15/16 x ⅜ to ¾	.20 extra
⅝ to 11/16 x ⅜ to ⅝	.25 extra
½ to 9/16 x ⅜ to ½	.45 extra

Light Bands

	Per 100 Lb.
7 to 8 x No. 9 to 3/16	$0.45 extra
7 to 8 x Nos. 10, 11, 12	.50 extra
6¼ to 6¾ x Nos. 9 to 3/16	.35 extra
6¼ to 6¾ x Nos. 10, 11, 12	.40 extra
4¼ to 6 x No. 9 to 3/16	.25 extra
4¼ to 6 x Nos. 10, 11, 12	.30 extra
1¼ to 4 x No. 9 to 3/16	.20 extra
1¼ to 4 x Nos. 10, 11, 12	.25 extra
1 to 1 3/16 x Nos. 9 to 3/16	.25 extra
1 to 1 3/16 x Nos. 10, 11, 12	.30 extra
13/16 to ⅞ x No. 9 to 3/16	.30 extra
13/16 to ⅞ x Nos. 10, 11, 12	.35 extra
11/16 to ¾ x No. 9 to 3/16	.40 extra
11/16 to ¾ x Nos. 10, 11, 12	.45 extra
9/16 to ⅝ x No. 9 to 3/16	.50 extra
9/16 to ⅝ x Nos. 10, 11, 12	.55 extra
7/16 to ½ x No. 9 to 3/16	.65 extra
7/16 to ½ x Nos. 10, 11, 12	.70 extra
⅝ x No. 9 to 3/16	.75 extra
⅝ x Nos. 10, 11, 12	.80 extra

Half Oval and Half Round

	Per 100 Lb.
2¼ to 3	$0.30 extra
⅞ to 2	.25 extra
¾ to 13/16	.35 extra
⅝ to 11/16	.45 extra
½ to 9/16	.60 extra
⅜ to 7/16	1.25 extra
5/16	1.75 extra
¼	2.25 extra

Half oval, less than ¼ their width in thickness, extra price.

Horse Shoe Iron

	Per 100 Lb.
All sizes	$1.00 extra

Cutting to specified length, 2 ft. and over, 10c. extra.

Beveled Edge Box Iron

Same as light bands of same sizes

Oval Iron

	Per 100 Lb.
¼ to 1½	$0.20 extra
¼ to 13/16	.25 extra
¼ to 11/16	.30 extra
¼ to 9/16	.40 extra
¼ to 7/16	.55 extra
¼ to 9/16 x 3/16	.50 extra
¼ to 11/16 x ⅛	.60 extra

Quantity Differentials

All specifications for less than 2000 lb. of a size will be subject to the following extras, the total weight of a size ordered to determine the extra, regardless of length and regardless of exact quantity actually shipped.

	Per 100 Lb.
Quantities less than 2000 lb. but not less than 1000 lb	$0.15 extra
Quantities less than 1000 lb	.35 extra

Extra for Cutting to Specified Lengths

	Per 100 Lb.
Hot sawing or shearing 24 in. and longer	$0.10 extra
Hot sawing or shearing 12 to 24 in.	.20 extra
Hot shearing, under 12 in.	.30 extra
Machine cutting, specified lengths, above 24 in.	.20 extra
Machine cutting, specified lengths, 12 to 24 in.	.40 extra

Machine cutting, to specified lengths, less than 12 in., according to contract, but not less than 60c. on each size. No charge for shear cutting to multiple lengths of 12 in. and under.

Machine Straightening and Centering

	Per 100 Lb.
Machine straightening and centering	$0.40 extra
Machine straightening alone, for ordinary sizes	.20 extra

Plant Education for Electrical Employees of Steel Mills

Due to the difficulty of obtaining efficient and trained men in the electrical department of iron and steel mills, the educational committee of the Association of Iron and Steel Electrical Engineers, as outlined in its report presented at the annual meeting of that association in Baltimore, Sept. 11, has investigated the extent to which the electrical employees in the various steel industries are being trained by special educational methods for their chosen trades. It believes that on the solution of the man problem hinges largely the success or failure of our industrial enterprises and that the cost of labor turnover could be greatly reduced by the adoption of a systematic industrial training course.

As essential considerations in the choice of an educational system it emphasizes that the power of sustained concentration must be developed in the men, that they must be taught to make logical judgments on important problems and that they must be trained to accuracy in every detail. The committee feels that the best results can be obtained for both the men and the companies by each plant operating its own school, but that where this is impossible, recourse may be had to a local Y. M. C. A. school or similar institution. It states that the majority of the companies from whom information on this subject was obtained conducted classes during work hours and paid regular wages for the time spent in the class rooms. The opinion of the committee is that 1½ hr. of concentrated effort on the part of each student is the available maximum class period in all subjects except drawing or laboratory work.

The 30 sales engineers and representatives of the John F. Byers Machine Co., Ravenna, Ohio, were called from all sections of the country to Ravenna for a joint conference and convention, Oct. 7 and 8. War-time problems in connection with the distribution of the firm's autocranes were considered. The social part of the session included a motor trip to Cleveland and a banquet at the Statler Hotel on Tuesday evening, Oct. 8.

FOUNDRY INDUSTRIES GROW

Steel Casting and Malleable Iron Foundries Increase—Electric Process Develops

A survey of the foundry industry made by *The Foundry* reflects the prosperity of the past two years. It shows a total of 6444 foundries in the United States and Canada on Sept. 1, as compared with 6290 two years ago a gain of 154. There were, however, 6507 in existence four years ago. Of the 6444 foundries, the United States has 5898, as compared with 5741 in 1916, but in 1914 5942 were listed in the United States. Canada shows a loss of three foundries as compared with 1916. It has a total of 546 shops to-day, against 549 two years ago; in 1914 Canada reported 565 casting plants. Many non-essential casting plants, it appears, have gone out of business and the new construction in Canada has been limited throughout the war period.

In the United States 4325 shops now are engaged in gray iron casting manufacture against 4267 two years ago, a gain of 58. Canada has 462 gray iron foundries, a gain of 5 in two years. There were 4575 gray iron foundries in the United States in 1914 and 483 in Canada.

The total number of exclusively non-ferrous metal casting plants and brass and aluminum departments of gray iron, steel and malleable iron foundries is 3472 to-day, compared with 3447 two years ago. The United States has 3159 non-ferrous metal melting plants compared with 3139 two years ago, a gain of 20. Though Massachusetts and Connecticut mark the center of the brass casting industry a westward trend is noted by a gain of 28 brass foundries by Illinois, the gain of 13 by Wisconsin and 11 by Ohio. The total number of foundries devoted exclusively to the manufacture of non-ferrous metal castings shows an increase of 57 in the last two years, the total to-day being 1280 as against 1223 in 1916.

To-day 426 plants are engaged in the manufacture of steel castings, by the crucible, open-hearth, converter and electric steel processes. In 1916 the total in the United States and Canada was 332. The United States shows a gain of 86, with a total of 390, as compared with 304 two years ago. Among the States Ohio shows the biggest gain, with a total of 15, but Pennsylvania and Illinois are tied for second with gains of 10 each. On the other hand, Pennsylvania has almost double the number of steel foundries of any other State in the country and leads with 86, Ohio being second with 47.

Probably the most remarkable showing is made by the electric steel casting industry, 161 plants having reported equipment for the manufacture of steel by the electric process. The United States has 143 of these shops and Canada 18. The states of Washington and California report more installations than such large foundry states as Michigan and New York. The United States has 249 malleable foundries, a gain of 52 in two years, and Canada has 19, compared with 16 in 1916

Chicago retains its supremacy as the leading foundry center of the world, with a total of 188 shops, compared with 170 two years ago, a gain of 18; New York is second with 125 a gain of 10 in two years, and Cleveland is third with 115, a gain of 3.

The electrical industry in the United States, according to the census report of 1912, showed a total output of 11,532,963,000 kw.hr. and a total generating capacity of 5,134,689 kw. This census is made every five years, but the figures for 1917 have not yet been published. A near approximation can be had, however, by using the yearly percentage increase for the central station industry from 1913 to 1917 as follows:

Increase 1917 over 1916, 20.9 per cent.
Increase 1916 over 1915, 25.0 per cent.
Increase 1915 over 1914, 9.7 per cent.
Increase 1914 over 1913, 8.6 per cent.
Increase 1913 over 1912, 12.0 per cent.

On this basis, the total output for 1917 would be 23,000,000,000 kw.hr. and the capacity 10,269,378 kw.

War Labor Problems Grow More Difficult

New Wage Adjustments to Cost of Living—More Men Must Be Had for War Work—Living Conditions Inquiry

WASHINGTON, Oct. 15.—Important steps are pending in the Government's labor policy, including the establishment of a new base for wages in important industries. For months the situation has become more difficult because of a lack of labor for war industries on the one hand and of a continuous demoralization of the wage fixing efforts on the other. This has necessitated action in Washington by all concerned, primarily the War Industries Board, the Fuel Administration and the various organs of the Department of Labor. It has even reached the President, who determined some time ago, as told in this correspondence, to find a way of co-ordinating the various authorities at work on the problem. The important steps now ready to be taken are the following:

1. Organization of a New General Wage Board.—This body will report directly to the President, and will consist of representatives of all the boards now dealing with wage questions in the various Government departments. This board will have a supervising authority over all wage decisions. It will practically be a conference for the various boards and is intended to prevent one organization from increasing wages or changing working conditions in a way that will upset wages and conditions in a competing industry or department.

2. Establishment of Relation of Cost of Living to Wages.—The first work of the new wage board will be to work out of the statistics which have been compiled, throughout the country, the increase in the cost of living to the general wage policy of the Government. It will be sought to find a uniform line in these living costs to guide the settlement of wage controversies. The particular effort will be to find in these a basis for wages which will prevent an increase in one industry from luring labor from other industries.

3. Increased Wages for Anthracite Miners.—Representatives of the miners and operators have had two weeks of conferences with Fuel Administrator Garfield and Secretary of Labor Wilson. The exact amount of the increase will not be made public until Thursday, but it is announced that it will affect 150,000 miners. An effort will be made to absorb most of the increase in a readjustment of prices without changing consumers' prices more than necessary. It seems likely also that bituminous miners will now get increases.

Shipyard Wages

4. Settlement of Shipyard Wage Question.—The "Macy Commission" of the United States Shipping Board has gathered a mass of statistics from shipyard cities showing a general increase in the cost of living. These have been co-ordinated with similar figures from the Department of Labor and are being used as the basis for the decision which is to be made on the request of the shipyard workers for higher pay.

5. Drafting Men for War Industries.—The term "drafting" is too strong; but the War Industries Board and the Department of Labor are trying to find means to force a speedier recruiting of labor for war industries. All the pressure the Government can bring through the War Industries Board and the Department of Labor—if need be, even the Provost Marshal General's office—will be used to see that the continued shortage of workers does not hamper material industries.

Talk but Little Action on Woman Labor

6. Recruiting of Woman Labor.—Although the details have not been completed for the Government's woman labor policy, the Department of Labor is putting machinery to work to substitute woman for man power in every possible line. Where it is decided that women can do the work as well as men, it is possible that the latter will be forced into essential lines by an extension of the "'work or fight" order.

The continued pressure by the War Industries Board is responsible for the steps to be taken by the Department of Labor to recruit workers for war industries by putting pressure on non-essential manufacturers. The United States Employment Service alone has found it impossible to cope with the increasing demands for both skilled and unskilled labor. The delay in handling the woman labor problem also has complicated the situation. But the demand for this labor in connection with the war program has mounted at a rate that has made real action imperative.

The War Industries Board is leaving the actual handling of the problem to the Department of Labor authorities but is backing them up by putting on the full pressure of its priority ratings. The first step in this work is the survey which has been ordered by the Department of Labor and which is being made by the community labor boards of the Employment Service. This service is intended to reveal just what non-essential industries are using men that can be replaced by women or given up entirely. As soon as the reports of this survey are available the Employment Service and the War Industries Board will co-operate in forcing these men into war work.

Drafting Labor

The use of the term "drafting labor" is being carefully avoided by all of the officials involved. But the progress being made indicates that the power of the Government will be used to force the recruiting of labor for war work in a way that will insure a sufficiency of workers for all needs. The co-operation of the Employment Service and the War Industries Board will also be backed by Provost Marshal General Crowder's office. It is even likely that the work or fight order will finally be extended to cover employments not now listed as non-productive. For if the labor authorities decide that women workers can generally take the place of men in certain lines of work it is expected that they will urge that these lines then be declared non-productive for masculine labor and thus force the men in those employments to find other work or to lose their draft deferments.

It is at this point that the delay in the making up of the Government's woman labor policy has had a hampering effect. The Department of Labor, however, is now trying to catch up with this situation and secure a more vigorous recruiting of women. In the District of Columbia there is a registration of all women available for the replacement of men, and it is likely that this will be extended to other parts of the country.

Must Have More Men for War Labor

"We must have more men for war labor," declared Chairman Baruch of the War Industries Board, "and we think we shall be able to get them. We have been promised the fullest co-operation by the labor authorities. But I am afraid that the people of the country do not realize how vital this situation is. New projects of the Shipping Board call for at least 190,000 men and the Ordnance Department's program involves a requirement of more than 200,000 additional workers. Of course, much of this program is spread over the first part of next year, but we must get ready for it now.

The War Labor Policies Board of the Government has been trying to co-ordinate the work which the Government is doing on all labor questions, and to a certain extent has helped to neutralize the obvious union labor control of the Department of Labor. It is this board which was largely responsible for recommending to the President the appointment of a new general wage

board, and the conference for its organization were held under the presidency of Chairman Frankfurter. The War Labor Policies Board also is in control of the work which is being done to meet the woman labor question. It is trying to lay down basic principles for wage fixing, although it has no power over strike controversies.

Commission on Living Conditions of War Labor

Conditions outside the plants under which the workers in many of the war industries are living have reached the point where the production program is being jeopardized, says an announcement of the Department of Labor. The War Labor Policies Board accordingly has investigated the situation and recommended the creation of a Commission of Living Conditions of War Workers. The essential purpose of this organization, which is to be a branch of the Bureau of Industrial Housing and Transportation, is to eliminate the circumstances which in many places have caused a huge turnover of labor with a consequent retarding of production. The commission will consist of a chairman and four other members to be appointed by the Secretary of Labor. The commission is to investigate, in cooperation with federal bureaus, boards and departments, living conditions where war industries are located. It is to advise Governmental agencies concerning matters conducive to a maximum production. The commission will have on its staff specialists in recreation, education, public utilities, public safety, health and sanitation.

Prohibition and Coke Output

UNIONTOWN, PA., Oct. 12.—All saloons in Pennsylvania together with theaters were closed Friday, Oct. 4, by State Commissioner of Health, B. F. Royer, as a measure to prevent the spread of Spanish influenza. In supplementary orders the ruling was made to include social clubs, distilleries, and breweries. Druggists may only dispose of intoxicants upon a physician's prescription.

Coke operators are firm in the belief that the restrictions placed upon the sale of liquor will have a good effect but there are some who claim that the sudden cutting off of the liquor supply will have a reacting effect.

At this time it cannot be determined if an epidemic of influenza is to be added to the difficulties of the coke region. Several hundred cases have been reported, but at only one mining plant, the Continental No. 2 works of the H. C. Frick Coke Co., has the plague reached epidemic proportions.

There was a depressing drop of 27,000 tons in the production for the week ended Oct. 5 attributed principally to continued interruption of electric power service and the distribution in large packages of intoxicants from illegitimate sources. Operatives were immediately sent out and it is hoped the liquid flow has been stopped in so far as it enters as a factor for decreased production.

Declines to Extend Increase of Wages

WASHINGTON Oct. 15.—The National War Labor Board declined to extend the increase in wages granted the employees of the St. Louis Car Co. to the St. Louis Aircraft Corporation, as asked by the employees. It did, however, recommend to the company that it accept the award, even though the board had no right to order such a raise in pay. The board fixed 40c. per hour as the minimum wage rate for the St. Louis Car Co. workers, with an order for an increase of 25 per cent in the wages, effective June 15, 1918. For women doing the same work as men, the same wages shall apply, but otherwise the minimum rate for women over 18 years of age shall be 30c. an hour.

For the Willys-Overland Co., Elyria, O., the board ordered a 30 per cent increase for all employees who received less than 45c. per hour May 1, 1918, and a 25 per cent increase for all who received that amount or more. The same mimimum rates were fixed as in the St. Louis Car Co. case.

Bethlehem Steel Co. Adopts a System of Employee Representation

The Bethlehem Steel Co.'s various iron and steel plants at South Bethlehem and Steelton, Pa., Sparrows Point, Md., and elsewhere, were placed upon an eight-hour basis Oct. 1, and the privilege was extended all employees of appointing committees to take up labor questions with the management. The company posted the following notice of the change:

"Effective Oct. 1, all employees of this plant in hourly, turn, tonnage contract and piece-work rates, will be paid on a basis of time and half time for work in excess of eight hours on any day.

"It is also desired to provide ways and means of meeting with and bringing before the management problems affecting their working conditions, and to accomplish this the company proposes to establish a system of employee representation consisting of representatives elected by the employees to serve on various committees to deal with working conditions.

"The general principles of this system have been developed, and will be immediately submitted to the employees."

Rapid Production of Hand Grenades

WASHINGTON, Oct. 15.—Major General C. C. Williams, Chief of Ordnance, has written the Single Service Corporation, New York, commending the employees of that plant for having attained a production speed of more than 100 hand grenades a minute. While the production at this and other plants was in the midst of the speeding-up process, enemy influences in this country began spreading reports to the effect that the offensive hand grenade was not effective, and that persons employed in plants manufacturing them were wasting their efforts. General Williams, in his letter to the company named above, takes occasion to deny this. The third million of grenades made by this concern was shipped to France in September, having been produced in exactly one month's time. During the week ending Sept. 14 the plant shipped a total of more than 300,000, or 55,000 a day, Saturday being counted four-ninths of a day, and this despite the fact that the plant was closed down ahead of time Sept. 12 to permit employees to register under the selective service draft act. The maximum production was attained Friday, Sept. 13, when 55,200 grenades were turned out. Simple as it appears when completed, it requires twenty-five distinct operations to make a grenade.

Strike Demonstration at Colt Plant

Following the announcement that a hearing by the National War Labor Board on the demands of the employees of the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., had been indefinitely postponed, about 800 employees went on strike Oct. 12. The plant employs about 7500 and only a small part of the force appear to be interested in the demand of the machinists' union for an 8-hr. day and time and one-half for overtime. At a meeting Sunday afternoon, Major J. G. Woodbury, U. S. A., made a plea that the men return to work Monday morning, as all possible was being done to have a date set for a hearing at which the demands would be discussed. It is understood that the War Department has decided to take jurisdiction of the case instead of the War Labor Board. The leaders of the men announced that the strike was a protest against further delay and that they would return to work Monday morning.

The Pennsylvania Workmen's Compensation Board has announced that it will discourage the present practice on the part of many industrial corporations of making lump payments of compensation excepting in cases where the claimants desire to use such payments in the purchase of artificial appliances or for occupational training.

HOARDING OF MATERIALS

Large Stocks Come to Light—Further Restrictions in Iron and Steel

WASHINGTON, Oct. 15.—Charges of hoarding by manufacturers as well as dealers are being investigated by the War Industries Board. The charges cover all industries, and drastic action will be taken if the board determines that the hoarding is such as to interfere with the operation of essential industries. So far the board has done little commandeering, suggestions alone being enough as a rule to induce overstocked manufacturers to share with less fortunate competitors.

"This hoarding must stop," said Chairman Baruch. "Of late, there have been more and more complaints on this score. We have also noticed traces of it in carrying out some of our orders. For instance, it has been most interesting to find that every time we have considered ordering reductions in prices, both manufacturers and retailers have come to us to plead against the changes. 'We are overstocked,' they have told us. 'Lower prices would ruin us; let us get rid of what we have on hand first.'

"And then we have found that they had on hand larger stocks than they had ever carried in peace times. And where we have found that there was no question about the hoarding, we have had no mercy in ordering lower prices. But if it happened that prices were going up, we always were told, and sometimes by these same interests, that there were no further stocks to be had."

Further Iron and Steel Curtailment

The board is still ordering decisive curtailments in iron and steel consumption, both through the Priorities Division and the Conservation Division. The former division has ordered the boiler and radiator manufacturers of the conutry to reduce the use of iron and steel to a basis not exceeding 40 per cent of four-twelfths of its 1917 consumption, for the last four months of 1918, and to furnish its products for no use other than on orders placed by the United States Government or the Allies, or direct agencies of the same, for use in buildings constructed under permits by the War Industries Board or pursuant to permit of the War Industries Board, and in repair and replacement of existing heating and radiating equipment.

The bicycle and motorcycle manufacturing industry has been ordered to reduce during the last four months of this year to three-fourths of four-twelfths of the 1917 consumption, while the pocket knife industry must get along with 70 per cent for a similar period.

Special Priorities for These Lines

The Priorities Division has also decided upon a policy of special priorities certificates for the following lines:

1. Gas ranges, water heaters, room heaters, hot plates and gas appliances.
2. Metal beds, cots, couches and bunks, and metal springs required for their manufacture.
3. Wire bound boxes.
4. Black, galvanized and enameled ware and tin plate household utensils.

These industries are looked upon by the board as highly essential and the certificates are intended to enable them to meet their needs under vigorous limitations of the materials consumed. It is largely a problem also of distributing and equalizing stocks. There will be no guaranty, however, that materials called for by the promised priority certificates will be supplied.

To obtain such a certificate manufacturers must file with the Priorities Division a statement of the stocks on hand, in storage or in transit owned by him, his 1917 consumption of materials and output of products, and the quantities of materials needed to balance his stocks so as to be able to manufacture the reduced output permitted by the board. The manufacturer must further pledge himself that he will observe all regulations as to curtailment, economies, and substitutions of materials; to devote products to essential uses; and not to furnish products for resale to dealers without obtaining a similar pledge from them.

Supplies of copper brass are so limited that none of these industries are likely to be able to secure any stocks of these metals, and must keep their present supplies to meet repair needs. Where the new orders are likely to force a shutdown of factories, the War Industries Board promises to help in securing war work.

Cutting Down on Oil Stoves

The War Industries Board has ordered a drastic retrenchment in the manufacture of oil stoves. It is estimated that the new rules will save at least 25 per cent in the amount of iron and steel consumed and between 40,000 and 50,000 lb. of aluminum.

The use of nickel is eliminated. Under the schedule prepared after conferences with representatives of the industry there will be an elimination of 339 sizes and styles of oil stoves, heaters and ovens and of 127 sizes and styles of gasoline stoves and heaters. The Priorities Division of the War Industries Board has also issued a special regulation to restrict the output of oil stoves during the six months which began Oct. 1 to 50 per cent of the output during the winter six months of 1917-18. It has also asked that all production of gas stoves be stopped.

The same division has ordered a 50 per cent reduction in the output of sewing machines and of electric heating appliances, including electric stoves and ranges, for the next six months; a 75 per cent reduction is ordered in the output of metal stamps, metal stencils and metal tags or badges for industrial purposes.

Sligo Iron & Steel Co. Sold

The Sligo Iron & Steel Co., Connellsville, Pa., has passed into the hands of interests identified with the Commercial Iron & Steel Corporation and the Federal Export Corporation of New York. The company has a paid-in capital stock of $750,000. At a meeting in Pittsburgh on Oct. 9 the old officers and directors resigned, and S. C. Munoz, president of the purchasing companies, was elected president of the Sligo company; Dwight S. Guthrie, formerly with the Republic Iron & Steel Co., and for some time with the Federal Export Corporation, was elected vice-president in charge of operations; W. W. Darley, formerly with the Babcock & Wilcox Co., was elected vice-president and secretary in charge of sales; and Fred L. Watson, formerly treasurer, American Steel & Wire Co., was elected treasurer. Other directors elected are Samuel A. Benner, Harry Raymond and George M. Pynchon.

Industrial Conferences at Washington Canceled

WASHINGTON, Oct. 15.—In conformity with the request of the Government as a matter of precaution during the present influenza epidemic, Chairman Baruch of the War Industries Board directs that all meetings with industries planned to be held after Wednesday, Oct. 16, are to be cancelled. This does not apply to regular office and interdepartmental meetings, but these are to be held down to as few participants as possible. He suggested that each section chief of the War Industries Board telegraph those industries whose representatives expected to come to Washington that all meetings have been deferred until further notice.

Jackson Johnson, president of the St. Louis Chamber of Commerce and James E. Smith, president of the Mississippi Valley Waterways Association, have gone to Washington to confer with officials of the railroad administration regarding the specifications for the steel barges and towboats to be used in the federally operated Mississippi River transportation project. They will ask that the contracts for the construction of the permanent fleet be let as soon as possible.

Semi-Steel Shells Leading Topic

Activities in Manufacture for War Purposes Absorb Attention at Foundrymen's Milwaukee Conventions and Exhibit—Big Attendance and Successful Show

At the convention of the American Foundrymen's Association, held in Milwaukee, Oct. 7 to 11, in conjunction with the conventions of the Institute of Metals Division of the American Institute of Mining Engineers, the Iron and Steel Section of the A. I. M. E., the American Malleable Castings Association and the exposition of equipment and machinery under the auspices of the first named, the topic of paramount interest at all times was semi-steel shells, of which the United States Government intends to order vast quantities in various sizes for gas and smoke screen use. At a session held Thursday afternoon addresses were made by an ordnance officer of the United States and another by an artillery officer representing the French technical commission now in this country. The latter gave an excellent presentation of the metallurgical side of semi-steel. A representative of a large Eastern plant gave an illustrated address, describing the detail of the semi-steel methods employed in the plant with which he is connected. Aside from the possible difficulty in obtaining and maintaining the requisite mixture, the impression that prevailed was that the only other serious problem lay in the proper mechanical functioning of the cores. It had been expected that a report prepared by the semi-steel shell committee on manufacturing practice which has co-ordinated with the Ordnance Department, in an advisory capacity, would be presented at the convention, but it was explained that this could not be done until a release is given by the Ordnance Department. John A. Penton is chairman of the Advisory Committee.

It was confidently expected that the report would be presented until a visit was made to the plant of the Kohler Co., Kohler, Wis., a few days ago. There it was learned that shells were being successfully cast in permanent molds, the molds being coated by a pneumatic process to prevent contact between the hot metal and the mold itself, thus preventing chilling. It may be stated that the investigators, comprising members of both the committee and the Ordnance Department, were at least mildly surprised by what they saw and learned, and it was determined that a delay was in order to determine the wisdom of weighing this new method with the one already approved, and possibly accepting both. A representative of the plant section, production division, machine tool section, of the Ordnance Department, was present Friday morning and outlined the procedure under consideration for machining the shells.

It is the purpose of the Ordnance Department to give publicity only to methods of molding and machining which have been tried and proved, and given the full approval of the department.

The steel sessions were largely devoted to discussions of the work done in making ordnance castings, and at times the discussion became very liberal. Various processes entered the proceedings, but emphasis was laid on the casting of steel from the electric furnace and the converter process. Heat treating methods and results were given prominent place.

At the malleable sessions a sentiment which cropped to the surface conspicuously was that effort should be made to advance the standard of malleable castings and that effort should be put forth to overcome old-time prejudices against them. In the non-ferrous meetings the conservation of tin was perhaps the most important feature. On this subject there was a symposium of papers.

The number registered at the convention was about 2800 as compared with 2300 a year ago.

At the closing session of the American Foundrymen's Association the following officers were installed, having been elected by the directors the preceding day:

President, A. O. Backert, Penton Publishing Co., Cleveland.

Vice-President, W. A. Janssen, Canadian Steel Foundries, Ltd., Montreal, Que.

Secretary-treasurer, C. E. Hoyt, manager of the exhibition of the association.

The Semi-Steel Shell Meeting

THE best attended session of the entire gathering and the one regarded with the greatest expectancy was the special one on Thursday afternoon at which the sole topic was semi-steel shells. It was called to order by M. Penton, who briefly summed up the importance of cast shells to the foundrymen, and then introduced Capt. H. M. Huxley, engineering division, Ordnance Department. Captain Huxley's remarks were of an introductory character. He said the manufacture of semi-steel shells was undertaken several years ago in France, and that Great Britain had also made considerable progress in this direction. He regarded the experience of France as especially valuable. He said there was nothing very difficult about the manufacture, yet great care was necessary, as if but one shell burst in a gun, it was likely to kill the crew, and also have a bad effect on the morale of other gun crews.

As is well known, he said, semi-steel consisted of about 30 per cent. scrap. The engineering division of the Ordnance Department has formulated designs for shells ranging in diameter from 75 mm. to 240 mm. (approximately 9½ in.). The program of the department calls for a large number of the various calibers, and Captain Huxley believed that the foundrymen will be readily able to co-operate with the Government.

The next speaker was Lieut. Laurent of the French technical mission now visiting this country. Lieut. Laurent, accompanied by two associates, Captain Guillemin and Lieut. Blanchet, arrived just prior to the opening of the meeting, and their appearance in the French blue uniform stirred the gathering to enthusiasm. Amid applause, all of the delegates stood on their feet and the Frenchmen showed their appreciation with many bows and broad smiles.

Lieut. Laurent, first of all, regretted that Colonel Martinon could not be present, also apologized for his faulty English, then proceeded to give a brief history of semi-steel in France. Experiments has been made long before the war started, and incidentally, he gave the opinion that semi-steel will find many uses other than those occasioned by war. Lieut. Laurent said that in French practice the electric furnace or the cupola is used for melting. Turnings are used in

the electric furnaces, and the cupola charge consists in part of briquetted turnings. In the first months of the war, he said, the consumption of ammunition reached unexpected figures, and the shortage of steel made it necessary to turn to cast-iron shells. Here it was found, however, that the use of cast iron necessitated thick walls, and that this precluded the use of sufficient explosive. He said also that the cast iron shell bursts into a relatively small number of effective fragments. Adding steel strengthened the metal and permitted the use of a larger quantity of explosive and increased the number of effective fragments.

As for the manufacture of semi-steel shells, Lieut. Laurent regarded it as simple, and said that any well managed plant can make them. Speaking of the advantages in connection with their production, he said that the semi-steel plant can be erected more cheaply than a steel casting plant; that the output of a semi-steel plant can be easily increased; that the material used is less expensive and more easily obtained, and that the consumption of coal per shell is lower than with the steel shell.

French Physical Requirements

The speaker gave the following physical requirements:

Tensile strength, 35,550 lb. per sq. in., the tests being made with bars 0.63 in. in diameter.

The elastic limit differs in various opinions, but 14,000 lb. per sq. in., on a bar 0.63 in. was recommended.

Crushing strength should be over 142,200 lb. per sq. in.

The transverse strength should be equal to 1422 lb. per sq. in. on a test bar 2.56 in. long by 0.39 in. square.

The Brinell test must give a diameter of impression approximate to 4.25 mm., with a ball of 10 mm. and a pressure of 3000 kg. within 30 secs.

All of the test bars, the speaker said, were taken from castings which had cooled the quickest and at a point where the section of the shell was the thinnest. He said the French ordnance department had been led to adopt these tests, which were quick and inexpensive, as giving to the department the full control it desired. The manufacturer can be certain that his shells will pass inspection only when he makes these tests himself.

In regard to analyses, when shells are made in France from cupola metal, Lieut. Laurent said the carbon varied from 2.75 to 3.25 per cent., with the combined carbon as high as is compatible with easy machining. In small caliber shells, he said the combined carbon should be over 20 per cent of the total carbon. The percentage of silicon should not be in excess, as the lower the silicon, the lower the graphitic carbon. He said the amount of silicon required varied from 0.85 to 0.90 and 1.60 to 1.75 per cent, according to the amount of total carbon, and according to the thickness of the shell as this affects the rapidity of cooling. The proper silicon content had been determined by experiment, following which a formula for total silicon and carbon had been worked out. The total of these two elements should be less than 4.50, it being found that if this figure is exceeded, the metal will have inferior physical properties. As an illustration, he said that if the total carbon is 2.75, the silicon must be below 1.75, otherwise, the strength of the metal will be impaired.

On the subject of regulating the combined carbon by the employment of manganese. Lieut. Laurent said he regarded this procedure as needlessly intricate, and that if more than 1.20 per cent manganese were contained, the metal would be hard to machine. He recommended manganese running 0.6 to 0.9 per cent.

Though phosphorus is a detriment to strength, it can be contained to the extent of 0.15 to 0.30, certainly without detriment, as proved by the French practice. In that country, no experience had been had with phosphorus above 0.30, although in the United States good results had been obtained with the phosphorus as high as 1 per cent.

Sulphur in itself has no bad effect, although it makes the metal less fluid and tends to cause piping and blowholes. Good castings have been made, the speaker said with sulphur at a maximum of 0.12 to 0.15 per cent.

He said the best machining is possible when the combined and graphitic carbon are equal in amount. Like silicon, aluminum accelerates the precipitation of graphite, but he said that in its use it is essential that the percentage of aluminum be exactly determined and be entirely eliminated in the slag. The proportion in weight of aluminum should not exceed 0.0001. He said that the most effective results are obtained when melting is rapid and that it was advantageous to cast very hot metal in order to obtain a homogeneous mixture. Lieut. Laurent said that some foundries in France thought they could achieve good results by purely empirical processes, but he said that experience had proved that chemical analyses alone can be depended upon. He pointed out, incidentally, that if a melter's sources of pig iron vary, confusion is likely to result in the analytical results, inasmuch as the properties of cast iron depend upon the ores from which they are made.

Three Methods of Molding

Referring to molding methods in France, he said that three had been used, in one of which a flask is rammed by hand or by a mechanical rammer; second, molding in sections, while the third consisted of machine molding in which a plain jolting machine is used. He approved the last named method as increasing the yield and reducing hand labor, which could thus be usefully employed otherwise.

In the sectional process, the parts are baked and assembled, the mold consisting of three parts, one for the base, one for the nose and an intermediate section. This method was employed principally in the making of 75 mm. shells, and is adaptable to the employment of women. The shell may be cast in either green or dry sand, but it had been the speaker's observation, that foundries had decreased their rejections by molding in dry sand. The cores must be dried thoroughly and great care taken to prevent blowholes and other defects. They should be dried to a constant weight.

In some foundries, shells are cast with the base up and in others with the base down. There is no danger in casting with the nose down, but it is necessary to have plenty of metal in the riser and to allow ample provision for gas to escape.

Lieut. Laurent expressed the opinion that after the war semi-steel will find many uses in the production of machinery parts which must stand high stresses. With semi-steel it is possible to obtain a tensile strength of 47,000 to 50,000 lb. Furthermore, by adding various metals, such as nickel, it is possible to obtain alloys easy to mold, easy to machine and even suitable for stamping and similar work.

C. M. Schwab Appears

Mr. Penton then referred to a preliminary report which had been prepared by the semi-steel shell committee on manufacturing practice, of which he is chairman, and which has been working in an advisory capacity, under the authority of the Ordnance Department. The report is in pamphlet form but is still subject to revision as may be determined at meetings to be held later. Meanwhile, the report cannot be given publicity. Frank B. Howell, chief of the research department, American Radiator Company, Buffalo, N. Y., was then introduced. He presented a paper and showed a number of views describing the manufacture of semi-steel shells in the plant with which he is connected. Mr. Howell had not gotten much beyond the point of emphasizing the importance of care in making the master core box and the working core box, both as to their construction and the materials used, when he was interrupted by the appearance of Charles M. Schwab. Mr. Schwab on being urged to make an address gave one of his characteristic speeches. He praised the press, paid a tribute to Mr. Penton, related a few of his humorous stories and said that the United States within 90 days had placed in commission more

than 1,000,000 tons of ocean-going ships. He said he considered the submarine menace a thing of the past, just as he figured every other menace a thing of the past, including the things for which Germany stood. He was ardent in his praise of what foundrymen and metal workers in general had accomplished and said they might be sure of a big place in history.

Mr. Howell then resumed, pointing out that he was a much privileged character, inasmuch as he was permitted to speak both before and after Charles M. Schwab. He described the core arbor made of pipe (as illustrated in these columns last week), which preliminary to the forming of the core is given a spiral winding of burlap. The burlap prevents the clogging of the holes in the pipe, which serve as a means of escape for gases, and also facilitates the easy extraction of the arbors, inasmuch as the burlap burns away. The cores are subjected to two bakings, and between them the cores are dipped in a core wash which is kept thoroughly agitated. When metal is poured the core arbor rests in an anchor hole, its shank being threaded and fitted with a nut to permit it to be firmly held. When they are baked the cores are suspended by this shank in a rack, the latter being constructed of structural steel in such a manner that hundreds of cores can be hung at once, meanwhile being supported by a truck which is run into the core oven.

A. O. BACKERT

President American Foundrymen's Association

Mr. Howell described and illustrated flasks capable of holding one or four shells. The metal flows through a strainer gate, which in reality is a slab or core sand. Some do not follow this practice, but when a strainer is not used the mold must be baked. The riser, in height, should equal the diameter of the shell in the rough, and the casting should not be shaken out within 4 hr. after pouring. He said there are two ways of cleaning, one by hand, with an ordinary piece of emery, and the other in tumbling barrels, but that the latter process is extremely hard on the barrels. The interiors can be effectively cleaned with a piece of chain attached to a rod which is made to revolve rapidly. After the cleaning the casting is clamped in a frame and the riser cut off, which usually can be done in about 4½ min. with a cold metal saw. Mr. Howell said that aside from the core work, the making of the semi-steel shell was about equivalent to casting a sash weight. Among other things he pointed out the necessity of proper and sufficient vent holes in the cast-iron flasks; the flasks venting outward, while the core vents through the perforated arbor. In the foundry practice described a large ladle which pours from the bottom is used for mixing.

The speaker also described briefly some of the machining operations by which the opening of the shell is bored, the nose faced and the entire piece centered by means of an expanding mandrel, after which was shown the turning of the outside of the shell by means of an ordinary engine lathe with former block attachment. He said the United States Government has devised an elaborate blueprint, giving all necessary dimensions of the shells, and other data essential to their manufacture.

Declines to Discuss Permanent Molds

Mr. Howell's paper ended the program, but quite a number of the members lingered and one inquired of the chairman why the report of the semi-steel shell committee on manufacturing practice could not be published at once, as were the papers of the association, many of which he regarded as of far less importance. Captain Huxley was requested to throw some light on the subject, and the latter took the platform again to explain that he had just been advised that publicity should not be had until consent had been given by certain officials of the Ordnance Department at Washington.

In response to questions, some of which Captain Huxley said he could not answer because he lacked authority, he said that 1000 shells per day was probably the minimum which any plant could manufacture successfully in view of the overhead involved. He pointed out that a small plant would have to have a chemical laboratory as complete as that of a large plant, etc. He said that foundries with air furnaces had done some experimental work on shells, but he did not know that they had reached a manufacturing basis. Permanent molds he declined to discuss. He said that the Government would probably not advance money for molding, but that in cases financial assistance had been advanced to provide for machining.

Gray Iron Session

AT the opening of the gray iron session, Thursday morning, President Fuller announced the death of William J. Keep, Detroit, and on motion, the letter of announcement was referred to the resolutions committee with a request for appropriate action. Subsequently the committee reported a resolution deploring the loss which the industry had sustained and extending sympathy to his family, which was adopted.

In the absence of the contributors several papers scheduled for this session were read by title. The first paper was presented by Charles J. Stark, editor *Iron Trade Review*, Cleveland, his title being the "Sale and Distribution of Foundry Pig Iron in War Times." Mr. Stark reviewed the difficulties of recent months, gave the causes and told of the Governmental plan properly to distribute iron. He said that the war had put normal business in the discard, also that this is a war of ingots instead of one of castings. He pointed out that the production of foundry iron had not kept pace with the general production of pig iron and said that a complex situation confronts the foundryman unless he finds essential work to do. Mr. Stark's paper also contained statistics and was well received.

Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh, presented a paper on "The Use of Positive Displacement Blowers in Cupola Practice," in the preparation of which, he announced, he had had the co-operation of the late W. J. Keep. This paper discusses the different characteristics of positive displacement and centrifugal or fan type blowers. For a given change of pressure, it is stated, the delivery of a centrifugal machine varies much more than that of a displacement blower. The periodic vibrations or pulsations in the delivery of the displacement blower are discussed and the advantages of this phenomenon in cupola operation are pointed out. Data are presented on the proper sizes of blowers for varying sizes of cupolas and other conditions. Correct methods of installing and operating displacement blowers are also described.

The following papers were read by title only in the absence of their authors. Given herewith are the official abstracts of each paper, the available space precluding further notice at this time:

"The Continuous Two-Story Foundry," by J. F. Ervin, Michigan Motor Castings Co., Flint, Mich. In the introduction the author describes the handling operations encountered in a modern foundry making castings for automobiles and shows that 64 tons of material

must be handled for each ton of castings produced. If this vast quantity of material is to be handled economically the design of the plant must be carefully worked out. The two-story foundry has many advantages for work of this sort. Ground area is saved and a continuous flow of product assured. Great care must be taken to provide for the proper conditioning of the sand. Many continuous foundries have experienced trouble in this direction and up to date no completely satisfactory substitute for mellowing the sand in the heap on the floor has been discovered. The method of handling and conditioning the sand at the Buick foundry is fully described and illustrated. If the molding operations are conducted on a second floor, above grade, the building should be designed to avoid excessive vibration. The author states that with prime operations conducted on other than the grade floor the possibility of economy is counter-balanced by the added maintenance and operating difficulties.

"Organizing a Foundry for the Economical Production of Gray Iron Castings," by Paul R. Ramp, Campbell, Wyant & Cannon, Muskegon, Mich.: This paper reflects the results of practical experience in the operation of a large foundry. The author believes strongly in the efficiency of a system of simple reports made out by the foremen themselves as a result of their personal contact with their men and their work. Among these reports are the daily foundry defective work report, hourly progress report and weekly improvement record. The functions of daily labor distribution and production records also are discussed.

The paper contains a large number of practical suggestions. Among them are the following:

The time to make a new foundry pay is the first day castings are made in it.

It is surprising how many foremen there are who trust to luck and their men and get away with it.

The daily foundry defective work report gets the foreman out where we want him every morning—to the scrap pile.

It is better that a man be checked early in the morning than brought to account for lagging at the end of the day.

There are a good many men who would make efficient foremen if they were given more instructions on how to plan their work. A personal schedule is a good thing for some foremen. In organizing a foundry it is necessary to make many foremen. They cannot all be hired.

A simple molding machine plus brains equals more than a complicated machine.

In addition, this paper discusses core room organization, gives suggestions on mixing core sands, contains pointers on cupola, molding machine and cleaning room operation, and recommends that the patternshop foreman be placed under the foundry superintendent. A method of paying ladlemen who carry iron by the piecework system also is recommended.

"Recent Developments in Burning Oil in Cupolas," by John Howe Hall, Taylor-Wharton Iron & Steel Co., High Bridge, N. J.: Two cupolas used to melt iron for a 3-ton converter have been equipped to employ the Stoughton oil-burning process. Unusual conditions developing as a result of the pressure of war work have precluded an exact comparison of the results obtained when running the cupolas with oil with those secured with coke. The nature of the product and of the charges has been such that comparative results are difficult to obtain. The author points out, however, that the sulphur content has been lowered. Former difficulties encountered in keeping the tuyeres clean have been eliminated. He sums up the advantages in three respects: saving in coke, in labor and lowering the sulphur content. Details of the equipment of the cupolas are supplied together with data on fuel consumption.

"A Rapid Method for the Determination of Graphitic Carbon," by Frank H. Kingdon, Sullivan Machinery Co., Claremont, N. J.

Dr. Richard Moldenke, chairman of the committee on general specifications for gray iron castings, was not present and his report was not read, it being stated that it was tentative in character.

The Steel Foundrymen's Session

THE burden of the steel session of the foundrymen on Thursday morning, Oct. 10, was a presentation of the problems connected with the production of Army and Navy ordnance steel castings and a discussion of the success attained in this department of war work as the war has progressed. It was one of the most interesting and instructive of the many meetings. It was also one of the best attended. C. R. Messinger, Sivyer Steel Casting Co., Milwaukee, was the chairman.

Meeting Ordnance Specifications

Capt. E. R. Swanson, inspection division, Ordnance Department, Washington, opened the meeting with the presentation of an abstract of his paper, "Meeting Specifications for Army Ordnance Steel Castings." In the majority of cases, he said, producers were succeeding in meeting the specifications, particularly the difficult ones of grades No. 2 and No. 3. He considered the heat treatment a large factor in meeting these requirements, which he felt were not excessive. They are now the same as those of the American Society for Testing Materials. It is necessary, he emphasized, to have the best steel for army gun castings.

In the heat treatment, Captain Swanson said, the main difficulty had been that the annealing had been but little understood. A keynote to success was also the proper analysis. Annealing he considered a broad subject and many old companies are installing new equipment for this purpose. Some foundries are now achieving 100 per cent success and one foundry in Milwaukee had all of 17 heats passed recently.

The paper by John Howe Hall, metallurgist, Taylor-Wharton Iron & Steel Co., Highbridge, N. J., on "Ordnance Steel for the Army and Navy," was abstracted by Mr. Hauk of the same company in the absence of Mr. Hall, who was ill with influenza. Mr. Hall in his paper presented a comparative table containing the chemical and physical requirements of the Army, Navy, Lloyd's (British), and the American Society for Testing Materials specifications for comparison. In Mr. Hall's opinion it is not yet possible, in many cases, to use one and the same steel for both Army and Navy work.

Three important factors were emphasized by Mr. Hall in his paper which, if not observed, will cause trouble. First, the steel must be properly made and thoroughly deoxidized; second, equal care must be bestowed on molding and pouring test bars on the castings; third, great care must be exercised in the heat treatment. The author recommended double annealing in certain cases, which process he described. He also outlined the difficulties occasioned by the numerous tests demanded by its Government's rules.

Both of these papers were quite freely discussed. A. S. Hummel of the William Wharton, Jr., Co., Easton, Pa., sent in a written discussion which was read by A. H. Jameson, Bayonne Steel Casting Co., Bayonne, N. J., in which Mr. Hummel stated that both No. 2 and No. 3 grades of steel can be made by the converter. He considered, however, production in the basic electric furnace more satisfactory, but pointed out that it is advisable to keep the carbon on the higher side so as to offset the softer quality of electric steel.

The Annealing and Heat Treatment

A written discussion from R. H. Flinterman, president Michigan Steel Castings Co., Detroit, Mich., was also read by Mr. Jameson. He recommended a carbon content of 0.35 to 0.40 per cent for army grade No. 2 castings and one of 0.40 to 0.45 per cent carbon for grade No. 3, with a manganese content in both of 0.70 to 0.80 per cent. On all such heats, Mr. Flinterman said, he uses a straight annealing for about four hours at 1575 deg. Fahr. with subsequent cooling in the annealer, and that this was in most cases successful. For all heats analyzing under the limits mentioned, the author said he employs a re-annealing with a cooling in the air, and then a drawing treatment at about

1250 deg. Fahr., followed by cooling in the furnace.

A written discussion by T. S. Quinn, president Lebanon Steel Foundry, Lebanon, Pa., was also read by Mr. Jameson. Mr. Quinn urged that all foundrymen doing ordnance work be prepared to augment their equipment so as to keep up their capacity; this should be discounted in advance.

Views of the Ordnance Department

C. S. Koch, production division, Ordnance Department, Washington, and president Fort Pitt Steel Casting Co., McKeesport, Pa., opened a general discussion on the success of various producers in making ordnance steel castings by saying that he had visited many plants and found that annealing or heat treatment seemed to be the greatest difficulty. This trouble varies greatly, he said. Much depends on equipment for proper annealing, the same as in molding and gating. The Ordnance Department has not felt like giving out any instructions because foundry practice and conditions vary so. The Army was to get out a detailed pamphlet, but abandoned this scheme. The whole matter is really one of watching details, particularly annealing. The question of specifications for carbon came up once, but it was found that some foundries were meeting requirements with carbon as low as 0.20 per cent. Attempts have been made to install the successful practice of one foundry in that of another, but failure was the result. "I agree with Captain Swanson," said Mr. Koch, "that many are leaving the annealing to incompetent persons."

C. R. Messinger was of the opinion that a greater output of ordnance steel is possible if attention to detail is given, no matter what the process. Mr. Koch again took the floor and stated that no record has been kept as to what foundries had gotten their heats through on first tests, but he thought there were two in particular—one an electric and one a converter foundry. A very small number of open-hearth foundries are doing ordnance work. The difficulty experienced at first was sulphur and phosphorus, but by raising the limits this trouble had been removed. The foundries referred to watch every detail and probably good results could be obtained by any process.

T. S. Quinn was called upon for a statement. He said that in their foundry they had followed the lines of least resistance as to No. 2 and No. 3 steel, but that he was not prepared to say that their success was due entirely to electric steel. It is due to details surely, particularly as to pyrometer control and uniform heating. They started with low carbons and high manganese and had no reason to regret this practice. Mr. Quinn said he believed many foundries anneal once, but perhaps some anneal their castings twice. Their practice, he said, was to air quench and draw every heat, and they have no more than three heats fail in a month.

Mr. English, Milwaukee Steel Foundry, Milwaukee, testified that one heat treatment gives as good results as two. They had lost only six heats out of 2000 and their process was the converter. Mr. Messinger, when asked what his experience had been, said that they had had much trouble, but it was due largely to the mechanical side. After this had been remedied they had been quite successful. He emphasized the necessity for attention to detail and system.

In giving the report of the Committee on Specifications, Mr. Koch said the effort had been to get a uniform specification for the Army, Navy and American Society for Testing Materials, that those for the Army are now about the same as those for the A. S. T. M. They had not been as successful with the Navy; new ones were now being prepared but not yet issued. An important step had been the securing of another class in the new Navy rules.

Steel Foundries on the Pacific Coast

"Making Steel Castings on the Pacific Coast" was the title of an interesting paper by J. D. Fenstermacher, Columbia Steel Co., San Francisco. In presenting an abstract the author stated that there are now over 20 companies producing steel castings on the Pacific Coast and that they represent all processes. The remarkable development was due to the war and the consequent demand for ships and manufactured products of all kinds. The difficulties which such foundry men must overcome were described by the author. Very little pig iron is available and molding sand must be brought from Illinois. At his own company's plant near San Francisco, one basic open-hearth furnace has been making steel for some time from all scrap, using a petroleum or lamp black residue from oil refineries instead of pig iron.

Edwin F. Cone, associate editor THE IRON AGE, New York, called attention to the hitherto supposed fact that good steel could only be made as a regular thing from scrap and virgin metal in the shape of pig iron. He asked the author whether he found his steel as good as that made from scrap and pig iron and if there was any trouble with the castings. Mr. Fenstermacher said there had been no trouble at all after operating several months according to the all-scrap process, and pointed to the chemical and physical tests of the steel given in the paper.

"The Electric Furnace in the Steel Foundry," by W. E. Moore of W. E. Moore & Co., Pittsburgh, a description of the Moore furnace, and "The Advantages of Basic Linings for the Electric Furnace," by F. J. Ryan, Electric Furnace Construction Co., Philadelphia, were not presented, the authors being absent.

Malleable Iron Session

IN a paper entitled "Malleable Iron as a Material in Engineering Construction," H. A. Schwartz, National Malleable Castings Co., Indianapolis, pointed out instances where steel had been substituted for malleable at an increased cost and a decreased service. Objections in the engineer's mind to malleable iron were said to result primarily from a lack of familiarity with the product. He pointed out that many engineers appeared to lack confidence in the uniformity of the product as now manufactured; therefore it becomes necessary for malleable iron manufacturers to take such steps as may be possible to acquaint the engineering profession with what malleable iron is. Mr. Schwartz traced the early history of malleable iron manufacture and discussed fundamentals of the metallurgy of this product. Characteristics of steel, gray iron and malleable iron were compared by means of a series of graphic diagrams and illustrations of test specimens.

Annealing Experiments

H. E. Diller, General Electric Co., Erie, Pa., presented a comprehensive paper on "Experiments in Annealing Malleable Iron." The author had made experiments in the research laboratory of the General Electric Co. Samples were annealed in an Arsem vacuum furnace and in a silica tube heated from the outside by electricity. The experiments indicated that if the composition of the metal is correct, the only thing necessary for annealing is heat. The author also reached the conclusion that malleable iron could be annealed in a tunnel furnace in 48 hr. or less. In his experiments a tunnel furnace of the continuous car type was used. A discussion of this paper written by Philip d'H. Dressler, American Dressler Tunnel Kilns, Inc., New York, was read. It covered particularly the application of the continuous tunnel annealing furnace to the malleable industry.

A paper prepared by Major A. E. White, Ordnance Department, and R. S. Archer, bureau of aircraft production, Detroit district, on annealing experiments which the authors have conducted, was abstracted by Mr. Archer. In connection therewith lantern slides showing photomicrographs of malleable iron, annealed under different conditions were thrown upon the screen. Major White and Mr. Archer made their studies at the University of Michigan, having the co-operation of the Detroit Edison Co., Detroit. The annealing furnace used was of the continuous tunnel type similar to that

described by Mr. Diller in his paper, except that it was electrically heated. In annealing malleable iron Major White and Mr. Archer tried to preserve the total carbon content of the metal, and the atmosphere of the furnace, as maintained, was neutral toward carbon. No packing was used in any of these experiments. Castings were annealed at various temperatures, and the time allowed for annealing also showed variation. A general conclusion Mr. Archer reached was that the best annealing treatment for malleable castings must depend largely on local shop conditions and the use to which the castings are to be put.

Donald S. Barrows, T. H. Symington & Co., Rochester, N. Y., described a new core room building recently placed in operation at the company's malleable plant at Rochester.

Future of Malleable Iron Industry

Enrique Touceda, Albany, N. Y., read a paper on "The Integrity on the Casting," which was highly commended by members of the association. Professor Touceda pointed out that failure on the part of some foundrymen to make sure at all times that their castings are sound throughout is a "deep-seated canker which bids fair to eat into the vitals of the industry." Malleable foundry men, he said, must see to it that their castings are sound to the core, and sponginess in certain sections can no longer be tolerated. In the opinion of the author of this paper, the use of chills has done as much harm as good to the malleable industry. He pointed out that chills are not necessary to produce sound castings, and explained how desirable results can be achieved much more satisfactorily through proper molding practice and the use of feeding heads. He advised malleable foundry men not to lose sight of the fact that the changes brought about by the war have had a profound influence on all lines of business, particularly in the manufacture of iron and steel products. He predicted that after the war all ferrous products are going to be measured under higher and higher standards of inspection. Unsound castings are not going to get by, he declared, and he who thinks differently is most assuredly living in a fool's paradise. Mr. Touceda said that the opportunity of the malleable foundrymen is at hand because it has at last been demonstrated beyond a shadow of doubt that the most complicated malleable casting can be regularly produced by many concerns without a trace of shrink, and of a strength and ductility not thought possible some years ago. Discard the chill, Mr. Touceda recommended, and in its place substitute risers of such height and section as will furnish sufficient pressure of fluid metal to make sure the casting's integrity. He concluded his paper as follows:

"In the malleable industry a new era has dawned, a fact frankly admitted and acknowledged by the trade. Let us stand shoulder to shoulder for mutual help in the matter of soundness. Let the integrity of the casting be the very first and foremost consideration, for a solid casting made of ductile metal having an ultimate strength of 40,000 lb. per square inch is unquestionably superior to one in which shrink is present, though the test bars in the latter case yield an ultimate strength of 50,000 lb. per square inch and an elongation of 20 per cent."

"Advantages of Malleable Iron Versus Steel for Agricultural Castings" was the subject of the paper read by P. A. Paulson, Rockford Malleable Iron Co., Rockford, Ill. His conclusions were that malleable castings are in many ways superior to steel for use in agricultural implements. The cost and reliability of malleable, he pointed out, are such as would warrant even a more general use. To these considerations, he said, might be added the distinctive property which malleable has, namely, the resistance to the process of rusting, it having been found that installations of malleable iron castings have outlasted several installations of the same castings made of steel.

The A. F. A. committee on specifications for malleable iron castings reported that no regular meeting had been held since the convention a year ago in Boston. The report noted that at the June meeting of the American Society for Testing Materials the organization of committee A-7 on malleable iron castings was effected and a new tentative specification adopted in which the transverse test was omitted, and by which inspection is facilitated. The omission of the transverse test was recommended in part to simplify the specification and in part because at the time an insufficient number of transverse tests had been made to insure against the danger of adopting data incompatible with the tensile requirements or vice versa. Inspection is facilitated because castings are now accepted or rejected based on annealing oven charges instead of air furnace heats.

General Sessions of the American Foundrymen's Association

OF the two sessions of the A. F. A. on the morning of Oct. 9, one was devoted to general topics and one to safety and accident prevention. At the former, following the presentation of a paper on "Selecting the Sand-Blast Equipment for the Foundry," by H. D. Gates, Pangborn Corporation, Hagerstown, Md., President Fuller said that in his opinion every plant has its own cleaning problems which vary with the nature of the work. He said that often when the foundry and sand-blast engineer had decided on certain equipment, changes were subsequently found necessary and he believed these could be avoided if consultation were had with someone having actual experience in similar work. The official abstract of Mr. Gates' paper states that he lays down the principles which should govern the purchase of sand-blast equipment. Especially he recommends that the foundryman shape his investigations first to an intelligent understanding of what an efficiently planned system will accomplish and save, with purchase price a secondary consideration. The various types of sand-blast apparatus, including hose machines, rooms, cabinets, barrels and tables, are fully described, and their operating advantages and limitations are discussed. Dust control is also given due consideration. The advantages and disadvantages of various forms of abrasives are presented. The paper concludes with practical pointers on how to avoid operating troubles which usually arise from conditions not inherent in the sand-blast apparatus itself.

E. S. Carman, Cleveland Osborn Mfg. Co., presented a paper entitled: "Engineers—Their Relation to the Foundry in the Saving of Labor." The abstract states: The author points out how the American people are just beginning to realize that they never really knew the real definition of the word saving. With this as a text, this paper discusses the tremendous waste of manpower involved in making castings on the floor which can be more readily and economically produced on molding machines. In order to bring about the realization of foundry economies through the more extensive use of molding machines and other methods, the author makes a plea for the training of foundry engineers who are skilled both in general engineering and in foundry practice. These engineers should be attached to the staffs of jobbing foundries and when work is received from customers which can be improved, from the foundry standpoint, by changing the design, the foundry engineer should take up the question with the customer's engineering department. The paper is accompanied by illustrations showing the tremendous savings that can be effected with molding machines and through modification of design where necessary.

Mr. Carman said the country is short 1,500,000 laborers, and that in the automobile industry 12,500 molders had been saved by the employment of molding machines. At the conclusion of the paper, Mr. Fuller said that the desirability of placing the pattern on a board depended on the extent of production; if sufficient pieces are to be made the pattern should be placed on a board. From the floor the opinion was expressed that there is a tendency to go to extremes in all things, and that it is impossible for the engineer to always know in advance where castings are to be made as Mr. Carman advocated. It was agreed that great care is

fundamental in pattern designs where quantity production is the aim, and that the mounted pattern is desirable even in small foundries because of the difficulty of finding skilled men. The author pointed out the desirability of properly designing intricate castings so they can be made in the solid piece, so obviating machining and incidentally insuring the preservation of correct alignments. Another opinion from a member was that a fault of the modern shop lay in the draftsman's not taking his drawings to the patternmaker, coremaker and foundry foremen for their criticism.

Electrical Precipitation of Foundry Dust

As something for the future to develop, H. D. Egbert, Research Corporation, New York, presented a paper on the Cottrell precipitation process and its application to foundry dust problems. The abstract follows: This paper describes a novel method of collecting dust from tumbling barrels, sand-blasts, grinding wheels, etc., by means of electrical precipitation. The apparatus used in this process is fully described, costs are presented and the operation of the system is discussed. The underlying principles of the electrical precipitation processes also are described.

The essential elements of the precipitator are two sets of electrodes, of opposite polarity and appropriate shape so arranged that a silent or glow discharge is maintained between them by supplying the discharge electrode with high voltage direct current. The air or gas to be cleaned is passed between these electrodes, and the dust particles, becoming charged with static electricity, are assembled on the collecting electrode. Suitable apparatus for supplying and controlling the electrical energy is also necessary, together with apparatus for rapping the electrodes and removing or carrying away the dust.

Using By-Product Coke

J. A. Galligan, Pickands, Brown & Co., Chicago, presented a paper entitled "The Commerce of Coke." In part, it follows:

The presence of a by-product coke plant is a pronounced asset to adjacent foundries and should be the source of their coke supply if it can be arranged. Foundrymen should get in close touch with the new ovens and see that the best coke for their purposes is produced. Do not leave all the work of experimenting in the hands of the coke man. Be a party to the development of a suitable product, and do not expect to withhold your support until the ovens are producing exactly the kind of coke you want or need. The foundryman does not know in many cases what is wrong with a certain coke which may not suit him and therefore it is difficult for him to do much real co-operating in its improvement. If the foundryman, however, has the real spirit of co-operation and interests himself in working the problem out, he will at least get some very valuable information and will also probably get a better coke.

In the case of some ovens, the most favorable branch of trade may be other than foundries, for instance, blast furnaces. A good blast furnace coke is not always a satisfactory cupola coke. A change in coal mixtures may be necessary to get the right foundry product. The volume of available foundry tonnage may not be sufficient to warrant or permit constant operation of a portion of the coke plant on foundry coke. Foundrymen should then group their orders and have the coke plant make special runs for them on designated days, if such a thing can be arranged. The ovens may be located where the disposition of undersized coke is difficult or impossible. In this case the foundryman should not exact the usual foundry screening, but accept run-of-oven coke and use the small coke in core ovens, etc.

W. A. JANSSEN

Vice-President American Foundrymen's Association

I have presented this matter on the theory that ability to obtain coke near home is of more advantage to the foundryman than his patronage is of value to the coke plant, and this is true in a great many instances. The foundry consumption is less than 10 per cent of coke production, so it is apparent that cupola tonnage is not of great importance to some coke plants, while ability to obtain a coke supply nearby is an asset to the foundryman. He is the one to suffer from delays in transit, etc., not the shipper.

Mr. Fuller, commenting on the suggestion that foundrymen take run-of-oven coke said that fuel containing breeze slowed up the heats one to two hours a day and he suggested the installation by the melter of a screen which, he believed, would overbalance the disadvantage encountered in accepting such fuel. Mr. Galligan said his remark in this direction referred more to Southern furnaces, as the by-product ovens in the North usually are adjacent to markets for screenings.

A member stated he had been using by-product coke all summer and had found that more is needed than when beehive coke is used, whereas he had understood the reverse would be true. Mr. Galligan said less by-product coke should be necessary in view of its being a higher carbon fuel. He thought the situation might arise from the iron used being lower than usual in carbon (thus having a propensity to absorb carbon from the coke), the condition making a higher melting point, and consequently more coke, necessary.

C. E. Knoeppel and M. J. House, C. E. Knoeppel & Co., New York, were not present, and their paper on "Women in the Foundry" was read by title.

The last meeting of the convention was devoted to general foundry topics and was held Friday morning, Oct. 11, with Benjamin D. Fuller as the chairman.

Reclaiming Old Sand

An interesting paper entitled, "Effective Means of Improving the Quality of Foundry Sand Mixtures," by Henry B. Hanley, New London Ship & Engine Co., Groton, Conn., was presented in abstract by R. F. Harrington of the Hunt-Speller Mfg. Co., Boston. Mr. Harrington gave the results of interesting investigations looking to the greater use of old sand in foundry work. These experiments were undertaken to determine the mixtures of old and new sand best adapted to producing good castings. The investigators also studied the length of time required for mixing and the effect of additions of varying quantities of fire clay and sea coal. The author emphasized the importance of the correct mixing of sand and of the determination of the proper ratio of the various ingredients that are used for the different classes of work. He expressed the opinion that there is no doubt that ultimately ways and means will be found to use up all of the old sand and also that old cores will be broken up and used over again.

Machining Semi-Steel Shells

A valuable discussion of this paper was presented by Mr. Harrington in which he gave additional evidence of Mr. Hanley's conclusions in work that had been done at his company's plant in Boston. His discussion was illustrated with lantern slides.

Five other papers on the program for this meeting were omitted because of the absence of the authors.

An interesting diversion at this meeting was a confidential talk by F. O. Alton, power engineer, plant section, production division of the Ordnance Department, Washington, having to do particularly with the semi-steel shell problem. Mr. Alton had been sent to the convention by the Ordnance Department. Many of the facts which he presented were decidedly helpful in the

proposed development of this important war work, but all that he said cannot have publicity at the present time.

The Banquet

The annual banquet was a largely attended gathering on Thursday evening. It was featured by an address by Charles M. Schwab, director general, United States Shipping Board Emergency Fleet Corporation. W. H. Blood, Jr., assistant to the president American International Shipbuilding Corporation, Philadelphia, dwelt on the building of the great Hog Island shipyard and illustrated his description with lantern slides. Major A. Radclyffe Dugmore, of the British Army told of the work of the British army and navy in the war, illustrated by lantern slides.

Directors for Ensuing Year

The nominating committee reported the following as its selection of directors for the ensuing year, and the nominations were unanimously adopted:

H. R. Atwater, Cleveland Osborn Mfg. Co., Cleveland.
R. A. Bull, Duquesne Steel Foundry Co., Coraopolis. (Mr. Bull is now a captain in the Ordnance Department, A. E. F.).
A. O. Backert, Penton Publishing Co., Cleveland.
W. R. Bean, Naugatuck, Naugatuck Malleable Iron Works, Naugatuck, Conn.
W. A. Janssen, Canadian Steel Foundries, Ltd., Montreal, Que.
J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill.
H. J. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa.
H. A. Carpenter, General Fire Extinguisher Co., Providence, R. I.
H. E. Diller, General Electric Co., Erie, Pa.
S. T. Johnston, S. Obermayer Co., Chicago.
W. G. Kranz, National Malleable Castings Co., Cleveland.
Alfred E. Howell, Phillip & Buttorff Mfg. Co., Nashville, Tenn.
V. E. Minich, Sand Mixing Machine Co., New York.
C. R. Messinger, Sivyer Steel Casting Co., Milwaukee.
C. E. Hoyt, Chicago.
H. B. Swan, Cadillac Motor Car Co., Detroit.

The nominating committee consisted of Maj. L. L. Anthes, W. A. Janssen, S. T. Johnston, A. E. Howell, and V. E. Minich. They were appointed by President Fuller at the first meeting of the Foundrymen's Association.

Joint Opening Session

A BRIEF outline of the proceedings of the opening session, Oct. 8, was given last week, including the resolution again pledging to the Government the full resources of the allied metal trades for the full support of the war. At the time everyone was awaiting President Wilson's reply to Germany's request for an armistice. The joint session merged into the first one of the A. F. A.

In addition to what was reported of the speech by Governor Emanuel L. Phillipp of Wisconsin may be added his statement that all that the United States had accomplished in its wonderful preparation for war was directly due to industry and the captains of industry, and to these should be extended the thanks of the American people. The governor said that with all the attention that must be given to the war, it was time to look into the future. Some economic changes must ensue, but he said industry will not stagnate after the war. The first demand will be to improve our transportation facilities. Our railroads are wearing out and neither labor nor material is available to keep them in proper repair. He made a plea for transportation at minimum cost, which, he predicted, would become a demand of the people. He approved of inviting the returned soldier to settle on the land, but he said the farmers of the West will demand, and will get, better prices for their products than they received before the war, and one way to give it to them would be to give them better transportation at minimum cost. He believed that normal prices will return gradually and automatically.

Secretary-Treasurer Backert read the letter from Capt. R. A. Bull, the latter paying tribute to all American agencies now operating in France, to the Allied forces, and to the industrial army at home. He said that every ounce of energy wasted is added lives lost.

C. S. Koch, president Fort Pitt Steel Casting Co., now of the cannon section, production division, Ordnance Department, said it was not the policy of the Ordnance Department to advertise itself, but he would say that it had in hand a larger business organization than had ever before been in existence. After referring to the innumerable problems which presented themselves for solution he said the department had determined to proceed on the basis that constant deviation from fixed principles could lead only to chaos. In reference to foundry contracts he said it had been decided as the better policy to have contractors buy the castings they use, despite the drawback that lay in foundries sometimes not regarding such contracts as seriously as they would those which came direct from the Government. Some of the foundries, he commented, are not availing themselves of the service they can obtain from the production division, but as a whole they had done remarkably well, and that the industry could not be judged by a few "fall-downs" which usually could be traced to the fault of the foundries themselves because co-operation had not been asked. Mr. Koch laid stress on the importance of quality rather than quantity in ordnance work. He said he hoped that the necessity of allocating foundry work would not be reached, but it might come if foundries endeavored to confine themselves to the simpler work.

A letter from Edward N. Hurley, chairman of the United States Shipping Board, urged team work on extending foreign trade, and suggested that all organizations appoint committees to consider the subject, inasmuch as the time had come for "ships and shipping to be discussed throughout the land." He said the only excuse for not being interested is not being American.

Motion Pictures Command Attention

A paper on "Co-operation Between the Railroad Administration and the Metal-Working Industries," by E. D. Brigham, manager iron ore, coal and grain traffic, United States Railroad Administration, Duluth, was read in the author's absence. The writer considered the coal question practically solved.

By means of a remarkable series of moving pictures, with accompanying verbal description, Major Frank B. Gilbreth, Providence, R. I., presented "Modern Methods of Transferring Skill." The pictures, which were so constructed that photographs faded into line drawings, showed how one could be taught the mechanism of shells, grenades and guns, and how a novice can be trained in the proper taking down and assembly of arms. Graphically shown was the action within a shell in the piece from which it is fired, in flight, and at the moment of impact, the various actions being slowed down in the pictures to permit of ready mental grasp. Major Gilbreth laid stress on the importance of ascertaining the one best method extant and making that method general. He derided the stealing of wrong ideas, as so often happens. The Browning gun was shown in action, being taken down and reassembled, likewise trench mortars, rifle grenades, etc.

President Fuller's report, after summing up the curtailments and restrictions which the war has imposed on the industry, was in part as follows:

President's Address

"The installation of foundry equipment and modernizing of methods has been tremendously accelerated. Man power has responded to the call and the production secured by the combination of willing men and modern machinery has been in many cases fairly astounding.

"The advance in quality of products also has been notable in many instances. For example, the development of the cast-steel anchor chain, a foundry product showing astonishing results under test. Electric and open-hearth furnaces both show improvement in results. Cupola operation is also coming in for closer study, the introduction of oil for fuel being one of the promising innovations in this connection. Alloys are now successfully produced in cupola practice for mixtures which a

few years ago were made entirely by the crucible furnace process.

Coke Conservation Urged

"I would urge the conservation of coke as worthy of our earnest consideration, and while it is not wise to save in the furnace to the extent of losing through poor product, there is much useless waste in cupola practice and close attention to quality of material, upkeep of equipment, regulation of blast and conservative charging will show a handsome saving in many cases. By-product coke is being manufactured to a greater extent than ever before. In the purchase of coke I would recommend adding to the specifications a clause defining the minimum size, or, in other words, that the foundry be furnished a screened material. Much inferior coke has been delivered, one of the chief defects being the large proportion of fines or breeze.

"Coke Director Blauvelt has recognized this in recommending that coke shippers be penalized to the extent of $1 per ton for shipments of inferior material, a recommendation which would meet with hearty approval and support.

"Our Government, in its endeavor to standardize many essential products, has touched the foundry industry in stoves and furnaces. Reducing styles and sizes in this industry, as in others, will effect great economies. A development which has been of peculiar interest is the changing from malleable to cast iron in the manufacture of hand grenades for the Government, the change being made with a view to the safety of our troops. The change coming suddenly, was brought about quickly and with but slight disturbance to the industry, furnishing one more instance of the earnestness of the co-operation between the Government and the manufacturer.

"Of interest and promise to our industry is the adoption by the Government of the semi-steel shell. Experiments with cast shells seemingly have been sufficiently gratifying to warrant the Government in specifying a liberal production and the prophecy that this will take an important place in the industry. Standard methods of producing a satisfactory product are being earnestly studied and should be of assistance to all. The production of semi-steel shells promises also to be of interest to the malleable founder, as the air furnace is seemingly the ideal unit for producing a high grade and uniform material.

"At the Boston convention, last year, the American Foundrymen's Association recommended to Secretary of War Baker the advisability of sending to France a selected committee of foundrymen for the purpose of studying methods of semi-steel shell and ordnance manufacture. In view of the present call for semi-steel production I am very sorry that this recommendation was not acted upon, General Crozier, to whom it was referred, not approving.

French Data Would Be Valuable

"The difficulties in the way of successful production of these shells are by no means slight. Had the foundrymen been afforded the opportunity of acquiring first-hand knowledge of the French methods through a representative committee I feel it would have proved of great assistance to-day. It is true that there have been advancements in methods in some instances, but in general, the foundrymen are ignorant to a degree of what is entailed in the successful production of these shells and grief will result from attacking the proposition blindly.

"The production of grenades during the past year has been large. Much credit is due foundrymen for the manner in which shops have turned from lines very different to the successful production of grenade castings. The rifle grenade, made of malleable iron, calls for a casting soft enough to be easily machined and of tough composition, clean and sound, with the cores centrally located, etc.

"Such devices as multiple core boxes, ingenious arrangement of core plates, devices for turning out and handling dry cores, molding machines, short cut methods of ramming and venting, etc., have brought about an average production in some shops of 1600 to 1700 castings per machine molder per day, with 1200 to 1400 cores per day from each girl; men being used at the molding machines and girls for coremaking.

"One year ago at Boston the American Foundrymen's Association, realizing that we were in a position to be of assistance to our Government in formulating its war program, authorized the appointment of a War Service Board to co-operate with the Government in the placing of contracts for castings, preparing of specifications and rendering such other service as might be found necessary. Accordingly a board was formed of representative men of the cast iron, steel, malleable and non-ferrous branches of the foundry industry. Offices were established in Washington with our capable director, C. E. Hoyt, in charge, and for a period of six months the board rendered exceedingly valuable assistance to various Governmental departments. Being immediately acquainted with our industry our efforts were of value and highly appreciated for the reason that we were actuated solely by patriotic motives in contrast to many so-called war service committees camping in the capital city for the sole purpose of obtaining contracts for members of the organizations which they represented. Our board sought only to aid by giving advice regarding equipment of foundries, ability to produce, preparing of specifications, etc. In view of their previous experience, it required time for the various department heads to recognize the true attitude of your committee, but when its purpose became known it was made welcome and pressure was brought to bear to prevent discontinuing its activities when the Washington office was closed on July 1. The committee made an exhaustive survey of the entire industry of the United States for the purpose of ascertaining capacities, equipment, shop conditions, etc. The pig iron situation was investigated and the recommendations made resulted in more foundry iron being available than would otherwise have been the case had the plan to divert very large tonnages to steelmaking grades been carried out. Supported by the funds of this organization, having 'no axe to grind,' the work was carried out in the spirit of its conception, and you are to be congratulated on the results obtained. The pride I feel in having been your president is justified by the position we have attained."

The report of the secretary-treasurer showed that the association has a membership of 1072. Also submitted were the annual report of the A. F. A. committee on foundry costs and the annual report of the board of directors.

Meetings of the Institute of Metals Division

THE feature of the four sessions of the American Institute of Metals, now the Institute of Metals Division of the American Institute of Mining Engineers, was the symposium on "The Conservation of Tin," held Wednesday morning, Oct. 9.

At this session those present engaged in a thorough discussion of measures for tin conservation. A number of interesting papers were read dealing with various uses of tin and methods by which the quantities used can be curtailed. D. M. Buck, chief chemist American Sheet & Tin Plate Co., Pittsburgh, said that during the first five months of 1918, approximately 11,000,000 lb. per month of pig tin was consumed in the United States. Solder, bearing metals, bronzes, etc., used about 5,500,000 lb. per month; collapsible tubes, a little more than 250,000 lb.; tin foil about 500,000 lb., and the tin and terne plate industry somewhat less than 5,000,000 lb. In an effort to reduce this consumption and thus conserve our supplies of pig tin, Mr. Buck suggested the following methods of procedure:

Salvage: The most careful and systematic collection and re-use of tin and tin-bearing materials is economically important in that we thus secure the maximum benefits from our available supplies.

Substitution of other materials for tin: While tin, on account of its low melting point, softness, malleability, non-toxicity, etc., is peculiarly adapted for many uses, nevertheless it may seem desirable, during times of temporary stringency at least, to substitute for tin and for tin-bearing materials some other substances which may answer our purposes, though perhaps not possessing all of the desirable qualities of tin. It is conceivable that research in this connection may develop entirely satisfactory substitutes which may permanently replace tin for certain purposes.

Curtailment: For the time being, of certain lines of manufacture, not absolutely essential to the prosecution of the war.

Mr. Buck said that efforts along all the above mentioned lines are being made in practically all tin consuming industries.

Antimony as a Tin Substitute

G. H. Clamer, Ajax Metal Co., Philadelphia, said that the first metal which presents itself as a substitute for tin in the manufacture of bronze bearing metals is antimony. He said that his company has found it possible to make alloys carrying as high as 30 per cent of lead, with 3 per cent of tin, and 2 per cent of antimony. It has also made alloys of 65 per cent copper, 30 per cent lead, 2 per cent tin and 3 per cent antimony, and has replaced the 5 per cent of tin in this alloy entirely with antimony. Car bearings, the 4¼ x 8-in. size, made from the same pattern and subjected to a breaking stress applied longitudinally at the middle of the back of the bearing and throughout its entire length, broke at the following average loads: With 2 per cent antimony substitution, 60,000 lb.; with 3 per cent substitution, 62,000 lb.; with total substitution, 52,000 lb., as compared with a breaking load of 67,000 lb. for the alloy of copper 65, tin 5 and lead 30 per cent. Mr. Clamer said that castings produced with each of the three above mentioned alloys are not so satisfactory as those made with the straight tin alloy, being more or less rough and showing slight globules of lead on the surface. He said that a certain amount of nickel can be used for replacing tin with very satisfactory results but that castings produced when zinc is substituted for a certain amount of tin are decidedly unsatisfactory and that the substitution of aluminum for tin is entirely impractical. Mr. Clamer also said that the possibility of substituting alloys of an entirely different type presents an attractive field for research. The copper-tin-lead alloy, he said, had attained its position as the most desirable bronze bearing alloy but this does not mean that some other alloy may not be found which may give equally good or better results.

W. M. Corse, Ohio Brass Co., Mansfield, Ohio, suggested the following methods for conserving tin:

Reduction of the amount of tin in an alloy or compound.
Substitution of an entirely different metal or compound for tin.
The combination of the first and second methods.

Mr. Corse said that he had been for the past few years working with the alloy known as aluminum bronze, which is usually composed of approximately 90 parts copper, and 10 parts aluminum by weight. This alloy, he said, has many properties similar to the copper-tin bronzes, and he suggested that it could be substituted in many ways to conserve the use of metallic tin.

H. M. Waring, Pennsylvania Railroad Co., told in his paper of tests which have been made in the shops of this road with various non-ferrous alloys. He said that for a number of years no tin has been used in the lining metal of either passenger or freight car journal-bearings, except such small amounts as come in from re-melting old lining.

Solders, Containing Cadmium

Milton Lissberger, president, M. Lissberger & Son, Inc., Long Island City, N. Y., discussed the possibilities of conserving tin in the manufacture of solder. He divided solder into two classes, that which is used strictly for soldering purposes, or the joining and holding together of pieces of metal, and second, that which is used primarily for filling, in which the joining is a minor if not an entirely negligible factor. The greatest abuse of solder, Mr. Lissberger said, is in the use of high tin mixtures for these filling metals. A mixture of 25 per cent tin and 75 per cent lead worked at the proper heat and with proper fluxing, he declared to be high enough for any filling purpose. This has been demonstrated in the practice of the oil canners, particularly the Standard Oil Co. The best means of conserving solder in can making, it was suggested, is to deepen all baths whether on line machinery or for hand dipping. Overheating of the baths should be avoided and the top of all baths covered with a protecting material, such as sal ammoniac, oil, charcoal or ash.

Mr. Lissberger also emphasized the importance of reclaiming solder drosses. In some of the largest plants a great deal of dross is swept out as dirt. Mr. Lissberger gave as his opinion that for solder purposes a mixture of 46 per cent tin, and 54 per cent lead is the strongest that can be used, and particularly when one-quarter to one-half per cent of antimony is added. The U. S. Bureau of Standards has suggested that the highest mixture of solder to be used should be 45 per cent tin, and 55 per cent lead. The speaker said that this is a high enough mixture for any solder mixture. On any bath work he said that 40 per cent tin would be the highest tin content used, and on most bath work it has been demonstrated by various manufacturers in the past few months that from 35 to 38 per cent tin, according to the nature of the work will give ample satisfaction.

C. W. Thompson, National Lead Co., New York, said that consumers should be persuaded to use solder, babbitt metals and bearing metals, containing less tin, He recommended the use of babbitt metals containing higher percentages of lead than has formerly been the practice.

Cadmium as a Tin Substitute

A paper prepared by G. K. Burgess and Mr. Woodward, U. S. Bureau of Standards, Washington, was read by Dr. P. D. Merica, also of the Bureau of Standards. This paper told of various investigations conducted by the Bureau to discover ways of conserving tin. Questionnaires were sent to manufacturers. The conclusion as to bearing metals is that tin can be considerably reduced and in some cases eliminated entirely. Cadmium as a tin substitute in solder was suggested, it being stated that a mixture of 80 per cent lead, 10 per cent tin, and 10 per cent cadmium has been found successful for various uses. This paper stated that many manufacturers had complained that Government specifications require tin in larger percentages than are now used commercially. A joint committee representing the tin-consuming industries and various Government departments was proposed by the authors as a means of working out Government specifications that will curtail the use of tin in Government work.

Dr. C. E. Siebenthal, U. S. Geological Survey, prepared a paper, which was read, covering the cadmium supply of the United States with particular reference to the substitution of cadmium for tin in tin-bearing alloys. Dr. Siebenthal said that there has been a steady increase of cadmium in this country since 1910, reaching a total of 207,000 lb. in 1917. In the first eight months of this year there was produced 108,700 lb. of the metallic cadmium and 36,000 lb. cadmium sulphide. The plants producing metallic cadmium have increased in number . The metal is principally derived from zinc ore, in which it occurs in minute quantities. Aside from the United States, Germany is the only producer.

At the Wednesday session several technical papers were read as follows: "The Constitution of the Tin Bronzes," by S. L. Hoyt, University of Minnesota, Minn.; "Oxygen and Sulphur in the Melting of Copper Cathodes," by S. Skowronski, Raritan Copper Works, Perth Amboy, N. J.; "The Relation of Sulphur to the Overpoling of Copper," by the same author, and "Pure Carbon-Free Manganese and Manganese Copper," by Arthur F. Braid, Metal & Thermit Corporation, New York.

A large part of the meeting on Tuesday morning, Oct. 8, was taken up by the presentation and discussion of a paper by Zay Jeffries, research department, Alu-

minum Castings Co., Cleveland, entitled "The Metallography of Tungsten." The author went into a very thorough discussion of the crystallography of this metal and his treatment of the subject is of a theoretical nature from which practical conclusions can be drawn.

"Notes on Babbitt and Babbitted Bearings," by Jesse L. Jones, Westinghouse Electric & Mfg. Co., Pittsburgh, was presented in abstract by the author. Mr. Clamer said that the addition of small amounts of lead is an advantage to which he had called attention some 20 years ago. Lead in his opinion does not adulterate but up to 10 per cent is a decided advantage. One value in intermediate babbitts is that with an increased lead content they can be cast in thin sections.

Iron and Steel Section of Mining Engineers

IT was the first time that the iron and steel section of the American Institute of Mining Engineers held technical sessions in connection with the American Foundrymen's Association. There were two of these sessions scheduled on the general program, one for Tuesday morning and one for Wednesday morning, but owing to the small attendance that assembled for the first meeting, the two programs were consolidated for the meeting on Wednesday morning, Oct. 9. The chairman of this meeting was Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

Work of the National Research Council

The feature of the meeting was a paper by Dr. Henry M. Howe, chairman, engineering division, National Research Council, Washington, on the work of the council. In his absence, an abstract was read by Dr. John Johnson, secretary of the Council. Discussing researches by experts outside of the personnel of the council, Dr. Howe said that the winning of the war is retarded appreciably by the delay caused by the rejections in making certain important kinds of forgings, such as shells, crankshafts, cannon, etc. These rejections are due chiefly to faulty procedure in making and forging the ingots themselves. The faultiness exists because the rapid increase in the demand for such ingots has led many into this manufacture without sufficient experience. We are trying to solve this problem by means of our steel ingot committee, made up of men of recognized merit in this line, here and abroad, and under the chairmanship of Lieut.-Col. W. P. Barba. We expect this committee to prepare a set of detailed directions constituting recommended practice appearing over the names of French, British and American experts which should immediately become standard.

Dr. Howe then discussed the question of pyrometers and the work of the committee on the fatigue of metals under the direction of Prof. F. H. Moore of the University of Illinois, as well as the work of the ferroalloys committee under the direction of J. E. Johnson, Jr., which is studying the saving of manganese along three distinct lines. He also mentioned the work of the committee on the improvement of metals by treatment at a blue heat under the leadership of Dr. Zay Jeffries, director of research Aluminum Castings Co., Cleveland. The Council's plans regarding the study of electric welding through its committee on the electric welding of ships under the chairmanship of H. M. Hobert of the General Electric Co., was also touched upon.

Under the heading, "Researches By Our Own Personnel," Dr. Howe mentioned the section of mechanical engineering under Chairman Lester. Among the inventions which this section is now developing, there are 12, including a special gun for use on aircraft, aircraft propellers, tanks of various types, mechanism for the control of trucks, special telescopes and special aircraft motors.

Following the presentation of Dr. Howe's report, the paper "The Manufacture of Ferroalloys in the Electric Furnace," by R. M. Keeney, Ferro-Alloy Co., Denver, Col., was presented by title. Professor Richards, in announcing the paper, termed it a most admirable contribution to the literature of the subject and written by one of the most competent of metallurgists capable of dealing with this matter.

The World's Iron-Ore Resources

"Notes on Certain Iron Ore Resources of the World," is the title of a paper which was presented without reading. It covers the latest information concerning the resources of Brazil, Scandinavia, Cuba, Southern Europe, China and Alsace-Lorraine and was contributed respectively by E. C. Harder and W. Lindgren of the U. S. Geological Survey, C. N. Weld, of the Bureau of Mines, A. C. Spencer of the Geological Survey, H. F. Bain of the Bureau of Mines and Sidney Paige, also of the Geological Survey. The discussion of the deposits in Alsace-Lorraine by Mr. Paige, will be given attention in a later issue of THE IRON AGE.

Discussing this symposium, Bradley Stoughton, secretary, American Institute of Mining Engineers, said that this had been read at a meeting of the New York section of the institute a short time ago, but that its importance was even more emphasized to-day than when it was presented. Mr. Stoughton expressed the opinion that some years ago at an International Congress in Stockholm, the efforts of the Germans to obtain figures as to the world's resources of coal, had the same ulterior object in view they have pursued in other cases and the figures which they gave at that time were incorrect.

Dr. Richards, in further discussion of this paper, thought that not enough attention had been given to the quality of ores. American practice is accustomed to rich ores. He considered the limiting fact in the development of the world's resources to be the fuel with which to work the ores and that a careful study of the world's coal resources was as important a study as that of the ore resources.

Use of Pulverized Coal

H. R. Collins, Fuller Engineering Co., Allentown, Pa., presented an abstract of his paper, "The Use of Coal in Pulverized Form." Commenting on this, Professor Richards called attention to the fact that, aside from the recognized merit of its use, there is no chance to save the valuable by-products and that if a combination of this method with distillation could be devised, decided benefit might result.

A paper on "Carbocoal," by C. G. Malcolmson, Malcolmson Briquet Engineering Co., Chicago, was presented, but several other papers on the program received no attention because of the absence of the authors or their representatives.

The Machinery and Supply Exhibit

THE exhibit of foundry equipment and metal-working machinery which lasted throughout the period of the several conventions was declared to be the most successful ever held, this being the view of several long-time exhibitors. The aisles of both the arena and machinery hall were thronged at nearly all times, the interest being most intensive, of course, in those exhibits which had a war flavor. It was the concensus of opinion that the city of Milwaukee is to be congratulated on having such a large and complete building, and incidentally, handsome structure, for the convenience of conventions and expositions. Under one roof is a large arena, a hall of equal size and a number of convention halls, easily accessible to the exposition space. A restaurant and other facilities make it possible for exhibitors and delegates to remain in the building all day. The arena is not only large in area but is high vaulted, with a large central skylight affording ventilation. This large hall was decorated in a tasteful way. Two immense inverted umbrellas, decorated with

branches of greenery and American flags, were suspended in the center, while in a large oblong surrounding these were many large fern balls decorated with the Allied flags. From the center of the roof red, white and blue streamers sloped to an upper balcony, which in turn was decorated with groups of the Allied colors and festoons of Old Glory. The entrance to machinery hall was in the center of the arena floor, and aside from the general individual decorations there, leafy branches were intertwined around the pillars and fastened to the ceilings in the manner that gave a pleasing effect. In all departments, the machinery exhibit would have been larger had it been possible for the machines to be spared. Many of those shown were borrowed for the occasion, and in not a few cases were to be shipped by express direct to purchasers after the close of the show. Many good sales were made, some of them on the night devoted to employees, the show being open Tuesday evening.

Equipment Makers Organize for War Work

At a meeting held Wednesday afternoon, an organization was formed, to be known as the "Foundry Equipment Manufacturers' Association," of which V. E. Minich was chosen as president, and A. O. Backert as secretary. The main idea of the organization is to provide a vehicle for co-operating with the Government in the matter of its needs of foundry equipment. The following were selected to compose a War Service Committee to work in the direction mentioned:

V. E. Minich, Sand Mixing Machine Co., New York.

S. T. Johnston, S. Obermayer Co., Chicago.

L. L. Munn, Arcade Mfg. Co., Freeport, Ill.

F. G. Smith, Cleveland Osborn Mfg. Co., Inc., Cleveland, Ohio.

Elmer A. Rich, Brown Specialty Machinery Co., Chicago.

L. H. Atkinson, Air Reduction Sales Co., New York.

R. H. Bourne, Whiting Foundry Equipment Co., Chicago.

The committee held a meeting Thursday. It will try to reach every manufacturer of foundry equipment with a view of having them join the association. It will endeavor to expedite priorities, and render all assistance possible in the winning of the war. A subcommittee, consisting of the president, secretary and Mr. Smith, was appointed to obtain preliminary information on which action is to be taken.

Some Features of the Exhibit

The Ordnance Department, United States Army, had an interesting exhibit in the main lobby of the Milwaukee Auditorium. The products of a number of manufacturers were displayed. Surpassing in popular interest were the 75-mm. field guns and parts of these guns made by the Wisconsin Gun Co., Milwaukee. Rathbone, Sard & Co., Albany, N. Y., and Aurora, Ill., displayed shell cores and drop bombs. The Michigan Malleable Iron Co., showed a cast front wheel for Class B army truck. The Sivyer Steel Casting Co. displayed an axle bracket for a 75-mm. gun caisson and a spring hanger for the same type caisson. The Western Steel Casting Co. showed a steel artillery wheel. The Michigan Stove Co., Detroit, and the A. O. Smith Corporation, Milwaukee, displayed bombs. The Federal Pressed Steel Co. showed a gas projector. The Milwaukee Forge & Machine Co., Milwaukee, had on display rings for artillery tractors, gear rings, etc. The Falk Mfg. Co., displayed a steel tractor frame made in one casting. The Velie Motor Co., Moline, Ill., showed an American machine gun cart. Winslow Brothers, Chicago, showed 155 mm. howitzer shells. A motor for a four-wheel drive quad was exhibited, the castings for which were made by the Globe Stove & Range Co., Kokomo, Ind., while the machine parts were made by the Wisconsin Motor Co. A large drop bomb was shown by McCord & Co., Milwaukee, and a wheel for 155 mm. gun carriages shown by the Standard Steel Castings Co., Chicago. Trench mortar shells made by the Crane Co., Chicago; 8-in. steel shells made by the Root & Van Dervoort Engineering Co., East Moline, Ill.; a trench water pump made by the Evinrude Motor Co., Milwaukee, grenades made by the same company, and a complete 75-mm. shell made by the Allis-Chalmers Mfg. Co., Milwaukee, were also exhibited. The Federal Malleable Co. showed a rifle grenade casting gate. The Globe Seamless Steel Tube Co., Milwaukee, showed its line of steel tubes. There were also miscellaneous displays of shrapnel, high explosive shells, cartridge cases and other war equipment.

At all times there was an interested group in the booth of the Locke Pattern Works, Detroit, whose display consisted of patterns and flasks for the manufacture of semi-steel shells. There was shown a pattern and flask complete, the pattern being made of aluminum, steel-faced at wearing points. The aluminum core boxes are steel-bushed and cyanided, to take care of wear. The core is formed on a plain jolt machine. The shell flask is of cast iron. The shell is poured with the nose or open end down. The core arbor consists of a perforated pipe to permit of the escape of gases. Provision is made for a large riser of the same diameter as the shell, and the pouring is done through a strainer plate in which there is a circle of small holes.

On an Osborn jolt stripper, the Cleveland Osborn Mfg. Co., demonstrated the making of a mold for the Stokes trench mortar bomb. The mold consists of a drag and cheek, no cope being required, as the base of the shell is formed in a dry sand core. The bomb is cast nose down, and has four blades to regulate its flight. The core is formed on an arbor. At an Eastern plant, 175 molds, each forming two shells, are made per day. The cores are made on a core jolt machine.

The McLain-Carter Furnace Co. and the McLain System, Inc., were popular booths because of the interest in the McLain air furnace and its adaptability in the production of semi-steel. Among the many samples shown were semi-steel shells made at the Burlington, N. J., plant of the United States Cast Iron Pipe & Foundry Co. These were 8 in. in diameter.

Of a war character at the booth of the Davis-Bournonville Co., Chicago, were two portable oxy-acetylene welding and cutting outfits developed for the United States Army, one a cabinet truck, and the other an outfit for field work. The latter is contained in two metal cases, much resembling suitcases. One case carries torch, regulator, hose, etc., while the other is filled with supplies.

The Arcwell Corporation, New York, showed an alternating current arc welding transformer, having no moving parts, with inherent regulation, no resistance, or regulating apparatus being required. It is portable and known as the Mephisto Welder. Taps are brought out to give a range of current from 75 to 150 amperes. It can be used for pencil welding. The machine can be adapted to any voltage or frequency.

The Hayward Co., New York, showed in operation an electric motor bucket for use in foundries. A new feature of the bucket this year is the inclusion of a spring take-up, which provides for the back lash in the operation of the motor, there being a drop back in the motor operation after the current is shut off and before the electric brake takes hold. The action of the spring is such that the bucket will not open until the controller is turned.

The Tabor Mfg. Co., Philadelphia, showed a power shockless jar roll-over, pattern drawing machine, loaned for the purpose by the Campbell Mfg. Co., Muskegon, Mich., the machine being one of a type adopted by the Government in air-craft production.

Henry E. Pridmore, Inc., showed several machines, two in which special interest was shown being a 18 x 24 in. hand roll-over machine with an 8-in. draw, and a 24 x 24 in. jolt stripping machine.

A new style of jolt air-operating vibration pattern-draw machine for deep or shallow work and operated by one lever, was shown by the Arcade Mfg. Co., Freeport, Ill.

The Hausfeld Co., Harrison, Ohio, had an exhibit of several oil and gas-fired furnaces for non-ferrous metals, including a 100-lb. pot aluminum furnace, the melting being done in a cast-iron pot around which the flame circulates. Also shown was a tilting crucible

furnace, gas or oil-fired, and an open-flame tilting type furnace with a muffler top, the latter insuring a 4-in. vent regardless of the extent to which the fire brick of the top proper may have been enlarged. Also shown by the company was an adjustable ladle heater, which can be erected in units to stretch along the entire length of a shop. In all these devices the Maxon-Premix burner is used. The company is now developing a mold dryer.

The Wadsworth Core Machine & Equipment Co., Akron, Ohio, featured its navy type core-making machine, to which has been applied motor drive. A core cutting-off and core-coning machine, also shown, is motor-driven.

The Dayton Molding Machine Co., Dayton, Ohio, formerly the E. H. Mumford Co., Elizabeth, N. J., showed a perfected machine of the type displayed heretofore. It was a rock-over, draw machine, 28 in., 1200-lb. capacity, with a 12-in. draw, equipped with a new pressure leveling device designed to remove deflection from the rock-over arms prior to drawing the pattern, thereby obviating the crushing of sand in the mold. Another feature is a pattern change which uses no floating plate, but has two light steel bars on either side of the jolt table and will take any wooden pattern board by using four holes drilled in the board. In this machine no adjustment of drawheads is necessary as the leveling posts automatically take up any difference without adjustment.

The core-sand mixer made by the Keystone Mfg. Co., Cambridge Springs, Pa., was shown with a friction power dump, instead of a hand-operated dump, as heretofore. This mixer is now made in sizes up to 14 cu. ft.

A molding machine designed to fill the requirements of miscellaneous work, and therefore suitable for jobbing shops, was exhibited by the Mumford Molding Machine Co., Chicago. It was a 10-in. portable cylinder high-trunnion combination jolt squeezer with a 14 x 18-in. table. The side-rods have been eliminated to enable the placing of long flasks on the machine.

A horizontal sand-blast mill with a barrel 30 x 40 in. and presenting many new features was exhibited by the W. W. Sly Mfg. Co., Cleveland. Conspicuous on the machine was an improved door in the barrel which cannot be opened or closed until two levers at either end are struck sharply, their location compelling the operator to have his arms and head out of the way. When the door drops it locks automatically close to the opposite wall of the barrel. The drum is driven by a bull gear and all of the bearings are of the roller type. As it rotates, the barrel also oscillates. At either end, is a sand blast nozzle, which operates on the induction principle, but which can be fitted also with a booster type gun, giving increased efficiency. The sand feed is automatically regulated, and used sand is carried from the barrel by induction. At the top of the box containing the barrel is a vent to be connected with a dust arrester. An additional feature of the doors, already referred to, is that they cannot be opened until the sand pan under the machine has been removed. The capacity of the machine is 700 to 1000 lb., depending upon the character of the castings.

At the booth of the E. J. Woodison Co., Boston, a young woman, from the plant of the Cadillac Motor Car Co., Detroit, was engaged in making cores on a Swan machine. The company's exhibit was extensive.

William H. Nichols Sons, Inc., Brooklyn, N. Y., showed moving pictures of an 18 x 48-in. combination jolt and power squeezer with a gravity stripping device, and one-valve control. The machine was developed within three months for Government work.

C. E. HOYT

Secretary-Treasurer American Foundrymen's Association

The Dayton Molding Machine Co., Dayton, Ohio, displayed a machine of a type shown at Cleveland which has been perfected in various particulars. It is a Mumford patented rock-over, draw machine, 28-in., 1200-lb. capacity with a 12-in. draw, and is equipped with a new pressure leveling device which removes all deflection from the rockover arms previous to drawing the pattern, thereby obviating all likelihood of crushing of the sand.

A device known as the Magnetograph of the Davis-Bournonville Co., attracted much attention. It is used for cutting circles 2 to 12½ in., and steel plate from ¼ in. up is quickly cut with an oxy-acetylene or oxy-hydrogen torch, while in a vertical position. The device is largely constructed of aluminum to obtain lightness and is held to the plate by means of three electro magnets.

The compressed air used at the show was supplied by one of the Sullivan Machinery Co.'s angle compound compressors.

Walter H. Wangelin & Co., St. Louis, showed for the first time the Wangelin calculator, by which a foundryman can calculate accurately the amount of iron to use in a mixture in order to get the correct amount of silicon.

The J. S. McCormick Co., Pittsburgh, showed its Lion core binder, which was recently placed on the market. It is claimed for this material that it will not draw moisture, will not form gases and will hold the cores firmly.

The Torchweld Equipment Co., Chicago, showed for the first time its complete line of welding and cutting torches.

Edgar E. Brosius, Pittsburgh, represented by the Abell-Howe Co., Chicago, exhibited a model of a new slab-charging machine.

The Brown Specialty Machinery Co., Chicago, showed for the first time its pneumatic charging truck, which has an operating speed of 90 to 120 ft. per min.

A new feature of the exhibit of the American Foundry Equipment Co., New York, was its "Humane" type rotary table sand-blast room, 9-ft. diam. A smaller type was shown at the exhibit in Boston last year. In using the Humane sand-blast room the workman stands outside the steel casing, but sees his work clearly through a fine mesh shaded brass observation screen, and handles the sand-blast hose through a slot of soft rubber. Electric lamps light the interior, and air for ventilation is drawn into the room principally through the observation screen.

The Deister Concentrator Co., Fort Wayne, Ind., showed a laboratory-size Deister-Overstrom diagonal deck foundry residue table, one of the newer uses for which is the reclamation of foundry residue, thereby conserving brass.

The Pangborn Corporation, Hagerstown, Md., exhibited a new hygienic table cabinet sand blast, which is designed to safeguard the health of the operator, and his fellow workers. It is a semi-circular steel cabinet entirely inclosing the sand blasting operation and confining the dust and flying abrasive. Pieces to be cleaned are loaded upon the exposed half of rotative graded top table, which is turned by the operator to bring the work within the blasting inclosure. The sand-blast operator works from the outside of the cabinet. The cabinet is electric lighted, enabling the operator to see his work perfectly. The Pangborn Corporation also showed its new suction sand-blast cabinet for sand-blasting shells. The apparatus consists principally of four rotating chucks, driven at slow speed, which hold and rotate the shells while the blasting process is in operation. The chucks are mounted on large ball bearings and are contained in a metal case, the shells being held in a ver-

tical position with the opening pointing downward. Four suction-type projectors are arranged directly below the shell openings with the blast models in the position to project at a slight angle inside the shell opening. The bottom of the cabinet forms a hopper for storing the abrasive and supplying it by gravity to the suction feed boxes. The cabinet operates with either sand or metal abrasives and is produced for shells of various sizes.

The Hauck Mfg. Co., Brooklyn, showed a new portable ladle heater and a new burner for lighting core ovens, both being designed for use of oil.

Machine Tools Fewer in Number

That the machine tools shown were fewer in number than in previous years is not surprising in view of the difficulty in getting such machines to the exposition. In more than one case machines which it seemed sure would reach Milwaukee were taken at the last moment to fill orders backed by high priority ratings.

The Kearney & Trecker Co., Milwaukee, showed two standard machines, one a plain milling machine and the other a vertical machine, both engaged on regular shop production. It was largely through the efforts of John Kamm, of this company, that the exposition remained open Tuesday night for the convenience of employees in Milwaukee foundries and metal-working plants.

The Federal Machinery Sales Co., Chicago and Milwaukee, had an extensive exhibit despite the fact that some of the tools it had on order for the exposition did not arrive.

Other exhibitors of machine tools were the R. E. Ellis Engineering Co., Chicago; Kempsmith Mfg. Co., Milwaukee; Modern Tool Co., Erie, Pa.; Oliver Machinery Co., Grand Rapids, Mich.; Rivett Lathe & Grinder Co., and the Warner & Swasey Co., Cleveland, Ohio, the last-named company having the same practical exhibit of turret lathes on production work which has been shown in other years.

At the booth of the Marshall & Huschart Machinery Co., Chicago, interest was centered in a new No. 3 universal flat turret lathe made by the Acme Machine Tool Co., Cincinnati, Ohio. The machine will accommodate chucking work up to 17 in. in diameter, and bar stock up to 3½ in. in diameter and 44 in. long. The actual swing over the bed is 24 in. It has a side carriage which especially adapts it to chucking work.

The Phœnix Mfg. Co., Eau Claire, Wis., showed a new turret attachment for the carriage of an engine lathe, being substituted for the regular tool block. It is made in several types. These tools are being used by Winslow Bros., Chicago, in shell work. The new tool converts a single purpose lathe to a semi-turret.

The Caulkins-Carpenter Co., Chicago, exhibited its new sensitive drilling machine which eliminates clamps, latches, jigs and thumb screws for holding the work; saves time by automatically clamping the work, while the spindle is operated by a foot lever, all this leaving the operator's hands free to handle parts.

The Haynes Stellite Co., Kokomo, Ind., displayed many of its products, including standard insert tooth Stellite milling cutters which have stood severe tests.

The McCrosky Reamer Co., Meadville, Pa., displayed a new line of turrets for engine lathes. Three types are adapted to the T slot of the tool rest and accommodate standard tool bits 5/16 in., including ½-in. Four other types, which are built to order, fit lathes with swings ranging from 12 to 32 in. In them are eliminated such small parts as screws, springs and indexing pins. The indexing is effected by loosening the clamping lever which automatically raises the turret body to a height of about ⅛ in., thus freeing the lobing, after which the desired location can be made by clamping. Clamping the lever holds the turret rigid. The indexing mechanism has 12 locations. The company also showed a new adjustable reamer in which the blades move forward, and which has an independent lug for each reamer blade. Six sizes of blades cover all sizes of reamers in the machine and shell types from 15/16 in. up to and including 6 in.

The Racine Tool Mfg. Co., Racine, Wis., exhibited two new machines, one a combination metal cutting machine for slotting, key seating, gear cutting, hack sawing, profiling, broaching, etc., the other a high speed metal saw.

The Kelly Reamer Co., Cleveland, showed its new circular grinding and relieving arbor, designed for the elimination of stone honing, and to insure an accurate, mechanical means of circle relieving or "backing off" reamers of the Kelly floating or line bar type.

The Napier Saw Work, Springfield, Mass., pointed out a number of improvements in its band saw machine. This machine now uses a full 1-in. band, which gives greater tension, it is claimed, and thus insures straight cutting. Another new feature is a slide guide which prevents flattening of the edges of the band.

Judge Gary on Business After the War

Judge E. H. Gary, chairman of the United States Steel Corporation, in a newspaper interview is quoted as follows:

"It is but natural that after a period of business such as we have experienced in the last four years there will be some demoralization when conditions are changed radically. However, it is for the business man of this country to keep in mind that this is the leading country of the world; that the wealth of the world is largely here; that this country will continue to lead; that we will continue to progress, and that there will be business done on a large scale after the war.

"So far as the steel industry is concerned the plants in this country for some time have been devoted exclusively to war work for the United States Government and its allies, and no outside business has been taken. This has resulted in additions, extensions, new buildings and all other domestic work being postponed.

"In addition the warehouses of the world are practically bare of stocks of steel, which must necessarily be replenished. All this will likely result in a large demand for steel products for some time after the industry has been adjusted to a peace basis."

A Case Involving the Scrap Pledge

The Fishel & Marks Co., Cleveland, doing scrap iron and steel business, also warehousing raw materials in finished forms, was found by the War Industries Board, although the company insists it was done through misunderstanding of instructions, to have violated the pledge it had filed regarding the sale and distribution of materials. The Fishel & Marks Co. promises, however, to guard against any possible complaint in the future, and as an earnest of good faith has voluntarily donated $5,000 to the American Red Cross. An announcement in the above terms has just been promulgated by the War Industries Board.

In addition to helping Uncle Sam by buying Liberty bonds, Michigan workmen are proving their patriotism by working overtime, as shown in the Michigan Machine Co. factory, a short time ago. Certain tools were needed immediately by Dodge Bros., and the machine company could make them within the time specified only by continuous labor. Eight of the best toolmakers were called and the situation explained to them. They volunteered to work without rest until the tools should be completed. These eight men went to their benches at 6 o'clock Saturday morning and worked steadily until 2 P. M. Monday, taking time only to eat. The tools were made and delivered. They received time and a half for overtime, double time on Sunday and a bonus of $100.

The Pennsylvania State Water Supply Commission has approved plans for construction by the H. C. Frick Coke Co., of a river tipple, pier, ice breakers, fender piling, cluster piling and dredging of a harbor along the right bank of the Monongahela River at the Maxwell mine of the company near Brownsville, Pa.

Plan to Prevent the Abuse of Overtime

National War Labor Board Establishes Eight-Hour Day at Various Plants—Excess Wages Not to Be Paid Men Who Work on Sunday and Loaf on Monday

WASHINGTON, Oct. 15.—The National War Labor Board has rendered important awards establishing the 8-hr. day as well as the 48-hr. week in the plants of the American Locomotive Co. at Schenectady, N. Y., in the Mason Machinery Co. at Taunton, Mass., and the United Engineering & Foundry Co. at Youngstown, Ohio.

These decisions include a decree which is expected to do away with one abuse of the "double time for Sundays." It has been found that many laborers draw their excess wages for Sunday, and then loaf on Monday or on some other day of the week to make up for it. Under this ruling they will have to work seven days a week if they are to receive the double time. There is also a special provision to guard against all other excessive overtime.

The award in the American Locomotive case, which is made to apply also to the other companies, is signed by Joint Chairmen Taft and Walsh and Loyall A. Osborne and Victor A. Olander. This award follows:

1. The regular working time of each full week shall consist of 48 hours, divided into six daily periods of eight hours. All time worked in excess of eight hours within any one day or 48 hours within any one full week shall be considered overtime and shall be paid for at the rate of time and a half, but any time worked on Sundays or holidays shall be considered extra time and shall be paid for at the rate of double time.

By mutual agreement between the management and the workers, the daily working schedule may be so lengthened as to permit of a half-holiday on one day of each week.

It is further provided that no worker shall be entitled to payment for overtime or extra time unless he shall work 48 hours in said full week (or 40 hours when a holiday intervenes), except in the case of illness, accident, misfortune or other just and necessary cause.

The employer shall guarantee to each worker who shall be employed on the first day of any week the opportunity to work at least 44 hours in such week, or 36 hours where a holiday intervenes, exclusive of overtime or extra time, and in default of providing such employment shall pay the worker full wages for such hours, exclusive of overtime and extra time.

Excessive overtime shall not be exacted or permitted. And, in order that the same may be kept within reasonable limits, it is hereby decreed that where, in any one day more than two hours overtime in excess of eight hours is required, then, for that day, overtime shall be paid without regard to whether or not the worker shall, during that week, have worked the weekly schedule provided for.

2. For the purpose of securing the equitable application of paragraph 1 and adjusting all differences which may arise between the management and the workers in regard to its operation, a permanent committee of four persons is hereby created, two of whom shall be designated by the management of the plant and two by the workers, the decisions of any three of whom shall be binding. In the event of failure of the committee to reach an agreement, the case may be referred to the examiner of the National War Labor Board, whose decision shall be binding, except that either party may appeal to the War Labor Board, pending the adjudication of which appeal the decision of the examiner shall be in force and effect.

3. The American Locomotive Co. shall pay retroactively for all time worked in excess of 48 hours in any one week since May 1, 1918, and at the rate of double time for all work performed on Sundays and legal holidays, the company being allowed until Nov. 1, 1918, to make this back payment for overtime.

4. The secretary of the National War Labor Board shall assign an examiner to supervise the execution of this award. Should a controversy arise in respect to the interpretation of the award, an appeal may be made to the board, pending the adjudication of which appeal the decision of the examiner shall be enforced.

5. This award shall be in effect for the period of the war: provided, that on Feb. 1, 1919, and at periods of six months' interval thereafter, either party may re-open the case before the National War Labor Board for such readjustment as changed conditions may render necessary.

In the American Locomotive Co. case, the parties have agreed that the overtime payment should be retroactive to May 1, 1918. In the Mason Machine Co. case, the award is retroactive to June 18. There has been no agreement for retroactive payments in the case of the United Engineering & Foundry Co.

Fan Manufacturers Will Co-operate with Government

KALAMAZOO, MICH., Oct. 13.—Charles Clarage, president Clarage Fan Co., announces that the National Credit Association of Fan Makers has been asked for special co-operation by the Government in winning the war and that action will be taken to meet the requirements. A war service committee, comprising J. F. G. Miller, American Blower Co.; H. W. Page, B. F. Sturtevant Co.; Charles Clarage, Clarage Fan Co.; and H. W. Wendt, Buffalo Forge Co., has been named.

The organization is in receipt of a letter from J. H. Waterman, of the electric and power equipment section of the War Industries Board, asking that the Government be furnished with all available data regarding the fan makers of America, including the names of the various companies, chief executives, etc. Also the principal engine and turbine builders that each manufacturer depends on for motive power and any other information of value.

This letter referred to the war service committee resulted in two reports being filed:

First: That a committee of fan manufacturers be appointed, consisting preferably of an executive representative of each company in the association, to go to Washington to confer with the War Industries Board to see how fan manufacturers can best co-operate with the Government.

Work to be accomplished by the fan makers is (1) the elimination of sizes and types of apparatus not necessary for the period of the war, to conserve material and labor, and (2) to place information before the War Industries Board of the capacities and schedules of each company for each class of apparatus built by it which is used in the conduct of the war; (3) to present to the War Industries Board the requirements of fan manufacturers for outside purchases of motive power, and (4) other matters.

Report No. 2: The committee recommends to the fan manufacturers the elimination of all sizes and types of apparatus not necessary to win the war. All members are urged to present a list of all different sizes and types of apparatus they are prepared to build, and a separate list of those types and sizes they are prepared to discontinue for the period of the war.

The discontinuances recommended include the making of no cast iron volume exhausters or blowers larger than a 30-in. planing mill fan, special discharge fans to be eliminated as far as possible; the making of no steel plate fans for heating and ventilating work, and the making of only one type of engine and eliminating odd sizes of cylinders unless 20 or more are made on one order.

Both reports were unanimously adopted at the last monthly meeting, held in Buffalo.

The Clay Castings Co., New Cumberland, W. Va., is installing new equipment and will shortly operate on Government work. It is stated that C. E. Jackson and other Wheeling men have acquired a controlling interest in the company.

British and American Malleable Cast Iron*

Theory of the Two Industries Compared—Lack of Low Phosphorus Irons in England—Effect of Phosphorus Increase—Future of British Practice

BY PROFESSOR T. TURNER, M.SC

THE question of production of malleable castings in increased quantity, of greater regularity, and from a class of material which is not specially low in phosphorus has recently assumed national importance. Particularly are these castings required in the automobile and cycle industries, in the building and furnishing trades and for munitions of war. Such castings take the place of steel castings or of forgings or machined parts, for a variety of purposes, and are cheaper and more easily produced.

But it is not upon the basis of cheapness alone that malleable cast iron depends for its claim of extended recognition. Each material used in construction, whether it be cast iron, wrought iron, mild steel, harder steels, copper, brass or bronze has some property or combination of properties which renders it more suitable for a particular purpose than any of the other metals or alloys. For example, it is quite true that cast iron is cheaper than any other form of metal. But it is equally true that for certain purposes cast iron is so superior to wrought iron or steel that it would be retained for such uses even though it were more costly than its competitors.

The most remarkable property of malleable cast iron is its resistance to shock. The skill of the engineer should select the material which is most suitable for his purpose; while the art of the metallurgist should supply such material at the cheapest rate, of the best quality and with the greatest regularity.

Foreign and American Development

During the nineteenth century Great Britain was the chief producer of malleable cast iron, though the total annual output of this country probably never exceeded 75,000 tons, and was probably less. The trade has been largely in the hands of small manufacturers who had neither the opportunity nor the desire to study deeply its scientific principles. The business was profitable. But scientific and technical literature of this palmy period of the trade may be searched in vain for any important contribution from the British malleable cast-iron industry. To French scientists we turn for the classic contributions to our knowledge alike of the European and of the "black heart" systems of malleableizing; and to America we look for the extension and development of the industry on modern lines.

Though many details have yet to be made clear, the main principles which underlie the malleableizing process are now fairly well understood, thanks to the researches of Ledebur, Royston, Charpy and Grenet, Wüst, Hatfield, Smith and other workers. These principles may be briefly summarized as follows:

Carbon

Pure iron melts at about 1530 deg. C., which is higher by some 300 deg. than the melting point of ordinary cast iron. The pure forms of the metal, being so infusible, cannot conveniently be cast into any desired shape; but when iron is heated in contact with carbon it gradually absorbs more and more of the carbon as the temperature rises above 700 deg. C. At electric furnace temperatures upwards of 10 per cent of carbon may be dissolved. But if the product be allowed to cool slowly, all carbon in excess of about 4.30 per cent separates out and the residue is the iron carbon eutectic solidifying at 1130 deg. C. The iron carbide which surrounds the austenite is in the massive form, and is white, hard and brittle. Iron carbide can be caused to yield up its carbon, in the form of graphitic carbon in several ways.

By slow cooling from the molten state, or by prolonged heating to a temperature of about 1100 deg. In this case the carbon is separated in the primary or flaky variety of graphite, and the resulting material, though soft to the tool, is not malleable, but possesses the ordinary properties of grey cast iron.

By more prolonged heating at a lower temperature, the extreme limits being from about 700 to 1000 deg. C. The carbon then separates as secondary or fine-grained graphite; and if the annealing has been properly conducted the resulting metal is both soft to the tool, and also malleable. The carbon may be more or less completely removed during annealing, if the conditions are oxidizing, and the temperature sufficiently high.

Thus the essentials for the production of malleable cast iron are: To start with an iron free from graphitic carbon, and to anneal this white iron so as to decompose the whole of the iron carbide with the formation of secondary graphite or temper carbon (Ledebur).

The readiness with which graphite is formed or, in other words, the time and temperature necessary for annealing, depends upon the composition of the original iron casting which has to be treated.

The maximum variation of carbon in white cast iron is from 2.20 to 4.30 per cent. In practice the variations are not so great, and are usually between, say, 2.80 and 3.80 per cent. The samples which contain most carbon are the more fusible, they run freely when melted, are readily annealed and are suitable when work of special softness is required. Such irons are usually made in charcoal furnaces; the quantity available is small, and the price high. For the general run of work they are out of the question.

Silicon

Silicon combines with iron to form a silicide (Fe_2Si), which enters into solid solution in the excess of iron. In iron for malleableizing the usual range of silicon is from about 0.50 to 1.25 per cent. The average is about 0.75 per cent, and the higher proportions are met with in mottled or grey irons, which are used to permit of the admixture of a proportion of scrap, which has been partially desiliconized by remelting. So long as other conditions remain the same, the higher the silicon the more readily is the carbon precipitated. Hence a lower annealing temperature, or a shorter annealing is required with higher proportions of silicon.

Sulphur

Sulphur, on the contrary, tends to prevent, or delay, the separation of graphite, and the influence of quite small proportions is very marked. The percentage of sulphur present varies from about 0.05 to 0.40 per cent. With the lower proportions of sulphur annealing can be conducted effectively at a temperature of 750 deg. C., as in the black heart process. But with 0.25 per cent or more of sulphur, as is usual in British practice, a temperature of about 900 deg. is necessary.

Herein lies the first essential difference between the black heart and the white heart processes. To produce good black heart malleable cast iron it is necessary that the original pig iron shall be low in sulphur. Such pig iron low in sulphur and low in silicon also is regularly produced in the blast furnace in the United States. It is bought and sold to analysis and the malleable-iron founder is thus assured of a supply of pig iron of a uniform quality, containing about 3 per cent of carbon.

*From a paper read before the West of Scotland Iron and Steel Institute Glasgow, and printed in that society's *Journal* for March, 1918. The author is a professor in the University of Birmingham, England.

Such iron anneals at a lower temperature than does that which is supplied in this country.

In experiments conducted in my laboratory by R. H. Smith it was shown that when using pure materials the mechanical properties of malleable cast iron did not show any appreciable deterioration with less than 0.15 per cent of sulphur. In practice larger proportions are common in English works. So long as the sulphur does not exceed 0.25 per cent the properties of the final product made by the European process, on the commercial scale, do not appear to be adversely affected; but the cost of annealing is increased, as the higher temperature required involves extra costs in fuel, labor, renewals and repairs. The surfaces of the castings are also much more likely to be scabbed or roughened at a higher temperature; and this is probably one reason why in America the greater part of the malleable castings are used with their skin on, while in this country the greater part of the malleable castings, which are of any considerable size, have their skin removed.

Manganese

Manganese, if present in large quantities, keeps the carbon in solution and increases the difficulty of annealing. But there is evidence in favor of the view that a small percentage of manganese, from 0.15 to 0.40 per cent., actually assists in the separation of carbon. In some experiments by Hague and Turner, on the influence of silicon on cast iron, it was observed that the proportion of combined carbon, in the castings, was greater in the absence than in the presence of about 0.30 per cent of manganese. The reason for this effect has not yet been ascertained. Possibly it is due to the action of manganese in the production of sulphide with the sulphur which is present. But it is quite as likely that the explanation is to be found in some observations by Hatfield on the carbide of iron, which is separated from white cast iron by suitable chemical or electrochemical means.

Phosphorus

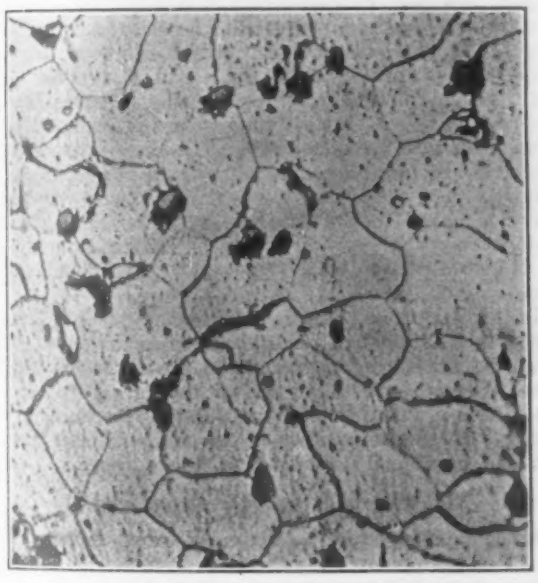
Phosphorus is well known to render cast iron, wrought iron or steel brittle when cold, and thus more liable to fracture when submitted to blows or shock. Hence the proportion of phosphorus in malleable cast iron must be low. This condition excludes the use of the large quantities of cast iron which are relatively high in phosphorus, and which are comparatively cheap and plentiful. As the demand for non-phosphoric pig iron is urgent in other directions it becomes important to determine how much phosphorus can be permitted with safety. In relation to the black heart process, Dr. Richard Moldenke, writing 15 years ago, gave the permissible limit of phosphorus as 0.225 per cent., and this figure has been since largely quoted and adopted. In 1915 some very interesting results were published by E. Touceda, who, starting with the idea that 0.20 per cent should not be exceeded, conducted a number of tests. For brittleness the "wedge" test was employed; the metal, in the form of a cast and annealed wedge, is firmly held in a vertical position, and bent by means of a falling weight. ["Phosphorus Limit in Malleable Castings," THE IRON AGE, Oct. 21, 1915.]

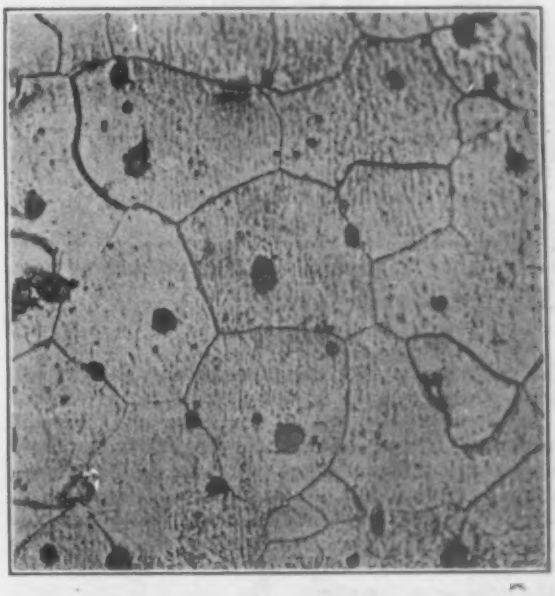
Phosphorus in the European Process

The question as to the permissible limit of phosphorus in the Reaumur process is of national interest at the present time, since malleable castings are in considerable demand, while the non-phosphoric pig iron is required for other and even more important purposes. It has sometimes been assumed that the limits found to hold good for black heart castings would also be true for white heart purposes. But the observed differences in permissible sulphur content might well suggest that there may be differences in phosphorus also. It is certain that those engaged in the trade have objected to any addition of phosphorus beyond that met with in ordinary hematite qualities, about 0.04 to 0.06 per cent.

Under these circumstances I requested J. H. Teng to undertake an investigation on this branch of the subject in my laboratory. It is hoped that the full results will be published in due course, but the work is not yet completed. I may, however, say briefly that sets of test bars, with various proportions of phosphorus, have been prepared from specially pure mixtures, and also from the ordinary commercial white pig iron with about 0.30 per cent of sulphur. These bars were annealed under works conditions, and the result showed that the mechanical properties were in every case deteriorated by the addition of only 0.05 per cent of phosphorus, and that the evil effect increased progressively as the phosphorus increased. Only the elastic limit was raised; the tenacity, extension, reduction of area, deflection under transverse test, and bending angle were all lowered steadily as the phosphorus rose from a mere trace to 0.50 per cent. The size of grain of the iron was also increased as viewed under the microscope.

The question to be settled, if these results be accepted, is not as to whether phosphorus adversely affects the properties of Reaumur malleable cast iron; but rather as to how far quality may be allowed to give way to other considerations under any special circum-





Figs. 1 and 2.—Phosphorus Content 0.05 per Cent and 0.52 per Cent Respectively. Ferrite rim from malleable cast iron containing 0.28 per cent sulphur, annealed in iron oxide at 900 deg. C. under works conditions. The crystal areas are larger in the sample containing 0.52 per cent phosphorus than in that with only 0.05 per cent phosphorus

stances. Or perhaps there may be the hope that by annealing in some special way, as by increasing the time and lowering the temperature, better results may be obtained in presence of phosphorus than has hitherto been found possible.

It may be of interest to briefly consider why the influence of phosphorus is different in the two malleableizing processes.

It has been shown by Dr. Stead that iron and phosphorus form a eutectic of iron phosphide (Fe_3P) and iron, which melts at about 980 deg. C. In white iron the phosphorus remains in solid solution with the carbide of iron. But as the carbide of iron is decomposed, with separation of graphite, an iron carbon phosphorus eutectic is formed, and this gives up carbon and forms the iron phosphorus eutectic. In the case of phosphoric grey pig iron it is also known that heating to just over 900 deg. C. may cause the separation of globules rich in phosphorus. It is evident, therefore, that at or rather over 900 deg. C. we are in the neighborhood of a critical range during which there is a tendency for the phosphorus to segregate or partially separate, with the formation of a weak and brittle material. At the same time it would appear that the grain of the iron becomes larger, and the coarser grain is associated with brittleness.

This is illustrated in two photo-micrographs; one is of the ferrite rim of a casting from a pig iron containing 0.05 per cent of phosphorus, and about 0.25 per cent of sulphur. The other is from the same iron, annealed side by side with the first, in the same box. The only difference is that the second sample, with the coarser grain, had received an addition of phosphorus which gave 0.52 per cent. in the casting. Figs. 1 and 2. Hence, in cases where the sulphur content is sufficiently high to demand a high annealing temperature, phosphorus cannot be present without deterioration in the product. But where sulphur is low, and the annealing temperature correspondingly reduced, phosphorus may be present to as much as 0.25 per cent and upwards without harm, or even with advantage.

It would appear to follow that, in the pig iron to be employed, either sulphur or phosphorus may be present, but not sulphur and phosphorus.

Remelting

The subsequent processes of remelting and annealing are largely governed by the proportions of sulphur and phosphorus. For special purposes, and in small establishments, the crucible is still frequently employed in this country. The changes which take place during remelting are small, and a hot fluid metal is obtained; but the cost in fuel and labor is excessive. Where the output is large the choice lies between the air furnace or the open-hearth gas-fired furnace on the one hand and the cupola on the other. The cupola is less costly to erect and has a higher fuel efficiency, but it reduces the silicon and increases the sulphur, and so produces a decidedly harder and whiter iron as a result of melting.

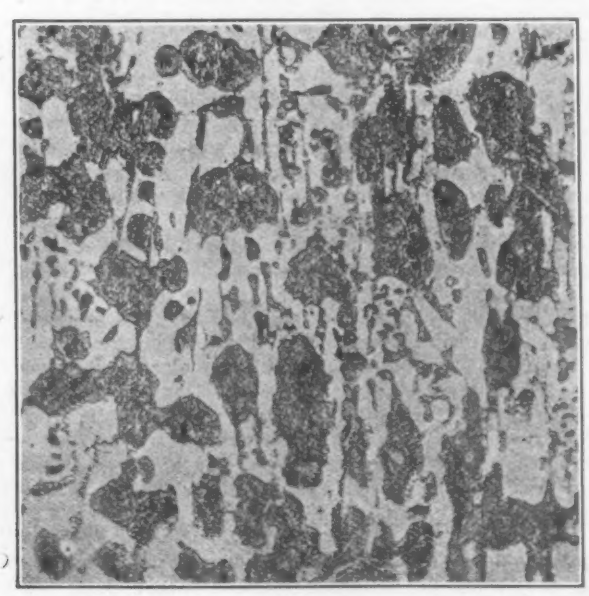


Fig. 3—Sulphing White Iron for Malleableizing. Sulphur content, 0.41 per cent. Magnification 250 ×

For the black heart process this increase in sulphur is so serious a detriment that the cupola has been almost abandoned in the United States in favor of reverberatory melting. Large air furnaces, using coal for fuel, are generally used, while gas-fired regenerative furnaces of 10 or even 20 tons capacity are also employed. They have as advantages not merely the fact that so little sulphur is absorbed, but also that the metal can be tested in the bath, before it is tapped, and any error in the proportion of silicon can be made good.

Annealing

Ultimately the whole success of the malleableizing process depends upon the proper conduct of the annealing process, for it is not the slightest use to have iron of the right composition, and well cast, unless it is made into uniform, trustworthy and satisfactory malleable castings. Larger castings require rather less silicon, or they may become grey before they are annealed. They require longer time for annealing. Silicon, as we have seen, shortens the time and lowers the temperature of annealing. Sulphur has the opposite effect. The temperature gradient during annealing should be kept as uniform as possible; it must first be raised to the necessary maximum and may then be somewhat lowered, as graphite will continue to separate, when it has once commenced to do so, at a lower temperature than that at which it began. The cooling must be very gradual through the critical range of about 700 deg. C., or part of the carbon may remain in the combined form and hardness and brittleness will result. Below 680 deg. C. cooling may be more rapid.

Annealing ovens in this country are often small and direct fired with coal. Gas ovens of larger size, either circular or rectangular, are, however, by no means uncommon. The gas is either obtained from gas producers attached to the furnace or, in South Staffordshire, from the Mond Gas Works at Dudley Port. Coal gas is also used for small outputs, or experimental purposes.

In America much larger rectangular ovens are employed, and the roof of the furnace is so arranged that it can be served by means of an overhead traveling crane. Cramps are taken out of the furnace roof, so as to leave a sufficient opening for the introduction or removal of the annealing boxes without interfering with the continuous working of the furnace.

Packing and Interior Structure

In some interesting conclusions drawn from a series of experiments on annealing a white iron, containing about 2.70 per cent of carbon, 0.70 per cent of silicon and 0.55 per cent of sulphur, E. L. Leasman concluded that the value of the packing does not affect the interior structure of the iron; rolling mill scale or fireclay give good results, and are cheap. Castings can be malleableized without any packing. A temperature of about 1600 deg. Fahr. (or 900 deg. C.) has been proved to be best for iron of the above composition; while 1400 deg. Fahr. (760 deg. C.) did not cause complete decomposition of the iron carbide. The time cooling to 1250 deg. Fahr. (690 deg. C.) is the most important variable in the process. The time of cooling from 900 to 690 deg. C. should be about 42 hrs., otherwise a hard, steely structure may be obtained. After 690 deg. C. has been passed the cooling may be more rapid without injury.

Though it is possible to anneal without any packing material there are advantages in its use which far outweigh its cost and the labor involved. Proper packing diminishes, or altogether prevents, the warping of castings during annealing which is otherwise a source of trouble. In the European process the oxide of iron in which the castings are embedded assists oxidation and expedites annealing. The hematite should be of good quality, and particularly should be free from fusible portions which would lead to scabbing of the surfaces of the castings. In America magnetic iron ore, of suitable size of grain, is largely used for packing.

The chief troubles in annealing, apart from surface defects, are excessive softness and brittleness due to overheating, or "airing," on the one hand, or hardness due to incomplete breaking up of the iron carbide on the other. The latter defect arises from deficiency of time or temperature during annealing. The structure of the original white iron and of the annealed casting is shown in Figs. 3, 4 and 5.

It is evident that no general rule can be laid down as to the proper time and temperature of annealing. These will depend chiefly upon the composition of the original castings, and the size of work to be treated. But given uniform composition and known sizes, then heat treatment controlled by clock and pyrometer should give satisfactory results. As showing what can be done in this direction, reference may be made to the statement of E. Touceda that when the wedge test was first introduced it was considered satisfactory if the sample withstood seven blows of the falling hammer. But at present an average of 35 blows can be readily maintained, and over 100 blows have been recorded. This result has not been obtained by the use of expensive irons or at increased cost of production, but by constant care to insure uniformity at every stage of the process.

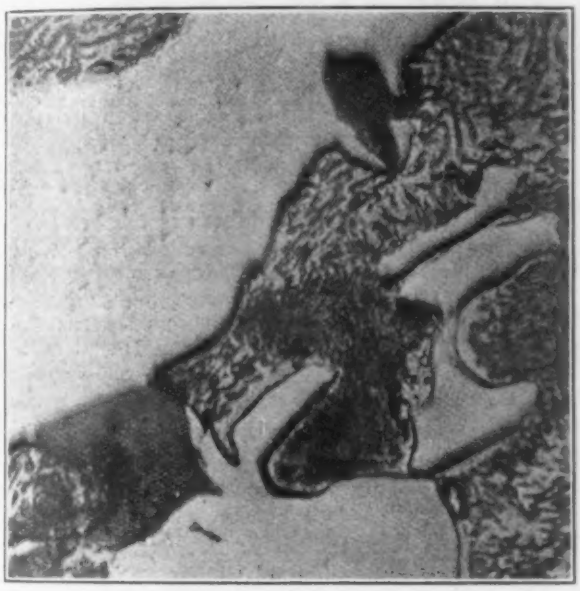


Fig. 4.—Sulphing. White Iron for Malleableizing. Sulphur content, 0.41 per cent. The white portions are the carbide; the striated, the pearlite and the dark, the sulphide. Magnification, 1000 ×

Black Heart as Future British Process

In endeavoring to look ahead at the malleable cast iron trade of the United Kingdom it would appear that the future here, as in America, will be with the black heart process. If the conclusion be correct that low phosphorus is necessary with irons containing upward of 0.10 per cent of sulphur, the alternatives are either to continue to make malleable cast iron by an expensive process, from dear pig iron, obtained from a very limited range of ores, or to employ an iron low in sulphur, and thus permit of the use of a somewhat higher percentage of phosphorus. The sulphury pig now sold to malleable-iron founders as refined iron is really the cheapest kind of hematite which can be made, since it requires less fuel and less flux for its production than any grade of grey iron. Instead of regarding such a sulphury iron as specially good and pure, I am inclined to look upon it as being dirty and unclean. For the majority of purposes I believe it should be abandoned, though this may necessitate some revision of our methods of working.

To my mind the questions which arise appear to be: Can the blast furnace manager in this country produce a straight-run low silicon, low sulphur pig iron, as is done in America?

If not, is he prepared to refine a low sulphur grey iron, so as to produce suitable pig for malleableizing?

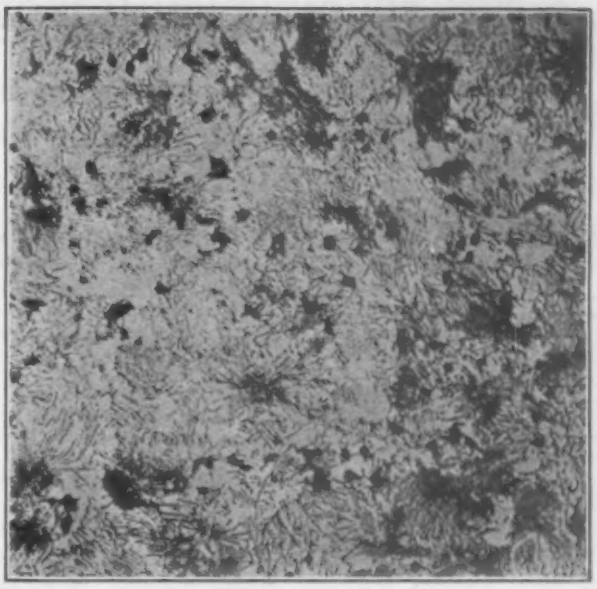


Fig. 5.—Good Malleable Cast Iron. Sulphur content, 0.28 per cent; phosphorus, 0.05 per cent. Bar center European process. Magnification 100 ×

Failing this assistance from the blast-furnace manager, the onus will fall upon the malleable-iron founder to abandon the cupola and by a suitable reverberatory furnace produce an iron with not more than 3 per cent total carbon, under 0.10 per cent sulphur, say 0.25 per cent phosphorus, and the necessary silicon, in the neighborhood of 0.70 per cent, for the purpose in view. Such a mixture could be made from grey hematites slightly too high in phosphorus for the making of good steel. This, mixed with about 20 per cent of wrought iron or steel scrap, would give 2.70 to 3 per cent of carbon, and the other elements in suitable proportion, provided, of course, that the melting was properly conducted.

This is not put forward as a new suggestion, for important firms in this country were beginning to work on such lines some years before the war. But the shortage of non-phosphoric materials has given added importance to the question at present. It is not denied that good results can be obtained from high sulphur irons, and no doubt it is an advantage to the blast-furnace manager to be able to sell such material. But, after all, is it worth while to use this sulphury pig iron when equally good results can be produced, in a shorter time, with less fuel and from a wider range of raw materials?

Note.—See also paper by Professor Turner, entitled "Malleable Cast Iron," published by the Ministry of Munitions, which shows a number of further interesting points and illustrations on this subject. November, 1917.

Federation of Manufacturers Proposed

The organization of the National Federation of Manufacturers of the United States will be formally considered at a conference of manufacturers to be held at the Hotel Biltmore, New York, on Wednesday evening, Oct. 23, it is announced by Warren C. King, president of the Manufacturers' Council of the State of New Jersey.

The objects of the proposed federation which will be discussed at the meeting are as follows: (1) to provide the medium by which to give consideration to the vital problems affecting industries; (2) to co-operate during the war and after with the Government; (3) to establish an office in Washington to keep in direct touch with the Government and its agencies; (4) to establish such other offices as may be best adapted to carry out its objects and policies; (5) to promote a better understanding between employee and employer; (6) to keep an alert watch upon national legislation affecting manufacturing, financial and kindred interests.

SAFETY EDUCATIONAL METHODS

Advertising the Value of Caution—Cartoon Bulletins—Plant Magazines

The importance of making all safety methods as highly educational as possible was pointed out by F. H. Elam, manager casualty department, American Steel Foundries, Chicago, in an address before the iron and steel section of the National Safety Council at St. Louis, Sept. 20. Referring to the importance to the safety engineer of enthusiasm born of an inherent sympathy for the worker and the community, he said:

The safety worker, be he safety engineer or inspector, who is lacking in this quality, no matter what his training and educational attainments may be, is in the wrong work and is doomed to failure, and the sooner that he gets into other lines of endeavor, the better for him personally and for the cause of safety.

The art of making inanimate things, such as bulletins, statistical charts, signs, guards and numerous other agencies truly educational consists in making them convey to the minds and hearts of the workmen their message by the aid of the illuminating quality or power referred to.

Safety Bulletins

There are differences of opinion concerning what safety bulletins should show. Many object to a bulletin picturing anything of an unpleasant nature, terming such as negative, forgetting that some of the most valuable lessons of life are taught by fear; and that the Creator would not have given us the power to react to fear if it was not to be an educational medium in our lives; also that life does not entirely consist of pleasant themes and experiences, but is made the richer by the suffering that is inevitable in every life and which if bravely faced will help us to better and nobler ways of living.

Just one example to illustrate the point:

The bulletin which faithfully and vividly portrays the results of infection and blood-poisoning in the body has great educational value. If the bulletin shows how slight an abrasion or an injury was at the beginning, and that no treatment, or that unclean and ignorant methods were used in treatment, and that such repulsive and terrible result followed, then also depicts the proper manner of reporting an injury to the plant surgeon and medical department, the workman has learned through the sense of sight that here is something to be shunned and the bulletin has produced results that no amount of oral instruction could have done.

The ignorant workman sees and understands where the spoken or written word would not be appreciated. The more intelligent workman has his attention attracted to the subject of the proper care of slight injuries in a way that appeals to him, because the approach has been made in what he considers an impersonal manner—no one has attempted to instruct him or ordered him to do some specific thing, two things which he resents with all his being.

When a copy of this bulletin reaches the front office, the manager's attention is challenged and a mental picture is portrayed that is not forgotten.

When the next monthly casualty report is submitted and he sees that there were 10 serious cases of infection during the month, he will appreciate as never before what the term "serious" means when applied to infection. When he further notes that nine of the above cases were the result of neglect, he will unconsciously visualize the needless pain and suffering that has resulted because some one in authority has been indifferent to express the situation as charitably as possible, and failed to see that these workmen were compelled to report to the doctor and receive proper treatment.

The result of this vision will be that the educational value of that particular bulletin will shortly be recognized by every foreman in the plant.

Bulletins that convey safety truths in the form of a caricature are powerful educational agents.

Cartoon Bulletins

I am not advocating that any injured workman be caricatured, but if the circumstances surrounding an avoidable accident can be humorously portrayed in bulletin form it will reach more workmen than the best photograph of the accident will, because it speaks in a tongue universally understood by the educated and by the ignorant alike, and is also understood by the foreigner "within our gates" as readily as by the native born.

As has been referred to, workmen resent anything that savors of forced instruction or positive orders. They also detest being preached to. The safety cartoon will deliver the message and "score a bull's eye" more often than any other agency, and do it so subtly that the workman is not conscious of the act.

Cartoonists are among our greatest educators, and it is to be regretted that so few of them are using their art in the interest of safety.

As opposed to the foregoing examples of what bulletins should be, I will use the term "positive" for want of a better word. The "positive" form of bulletin is used most often, and its educational value is high, the trouble being, however, to keep such bulletins from being too formal. There is a constant danger that they will overshoot the mark, because their formality, while in good literary taste, is lacking in the human touch or characteristics that will reach the workman.

Plant Magazines

The plant magazine is a medium of promulgating safety ideas of the highest order, but unfortunately its use is restricted to the larger units of industry. As an educational medium it has an accumulative effect, because it goes into the home and because its power is multiplied by the interests and home influences which its message starts into action.

Safety Leaflets

The safety leaflet is a tract preaching a sermonette for safety, and its educational value is great or small according to the ability of the author to express his thoughts in sympathetic understanding of the needs and limitations of his readers.

Safety Signs

Safety signs, illuminated and otherwise, have a large place in our safety work, and their educational value is great, being one of the first mediums of expression used in safety endeavor. To make these signs truly useful, they must be given the same quality of human sympathy and understanding as the other mediums which have been referred to.

Guards

Guards are not usually considered from an educational point of view, but are installed to prevent contact by the workman with dangerous locations. They have an educational value in that they are continually suggesting the thought of safety to every one who sees them.

Many have, no doubt, experienced difficulty in keeping guards in place after they have been installed and to prevent their destruction by thoughtless workmen who feel that the guards have been installed to impede them in their work and to save the employer money.

Guards are frequently equipped with signs which read, "Do not destroy," or "Replace at once after repairs are made," and similar slogans, but we find that such signs do not help to any great extent in keeping the guards in place.

If a guard could be given a personality, it would without doubt make it a subject of greater respect to the workmen, and the suggestion is offered that there might be attached to every guard a small sign which would read: "I am here for your protection," conveying the idea to every one that had anything to do with the guard that it was a personal matter on their part to reciprocate and do their particular duty in helping the guard to discharge or perform the duty for which it was constructed.

Liberty Loan Enthusiasm is Increased

After Lagging fo Two Weeks, Subscriptions Come in Much More Rapidly—Influenza Prostrates Many Workers—Director General Schwab Raises $52,000,000

Reports from all parts of the country indicate that the Liberty Loan continued to lag throughout the past week, but up to Monday, the nation had subscribed $2,748,419,950, or 46 per cent of the entire loan and the indications this week are that tremendous subscriptions will be made and that in all probability, the $6,000,000,000 will be raised by midnight Saturday. Influenza prevailing in many parts of the country has prostrated many workers and interfered seriously with the progress of the loan. The fact that the President's note of inquiry to Germany was received with disappointment also had a tendency to check Liberty Loan enthusiasm, which is now, however, at high tide following the President's last note to Germany.

In the New York district, the leading event of the week in the Liberty Loan campaign was the obtaining of subscriptions to the amount of $52,000,000 in bonds in 52 minutes by Charles M. Schwab, director general of the Emergency Fleet Corporation, who acted as Liberty Loan auctioneer at a luncheon given in his honor by the Fifth Avenue Association on Monday. Apart from Mr. Schwab's efforts, the Second Federal Reserve District's total at the end of the thirteenth day of the campaign, was $683,439,050. More than $1,000,000,000 must still be subscribed. Among the leading subscriptions in the New York district within the past week were the following:

Midvale Steel & Ordnance Co.	$ 3,300,000
Republic Iron & Steel Co.	1,000,000
Savage Arms Co.	1,500,000
American Car & Foundry Co.	1,000,000
Central Foundry Co.	100,000
General Electric Co.	10,000,000
Niles-Bement-Pond Co.	500,000
Standard Screw Co.	100,000
Continental Iron Works	100,000
Locomotive Superheater Co.	250,000
Henry Prentiss & Co. (additional)	150,000
Combustion Engineering Corporation	120,000
Hewitt Steel Corporation	100,000

Confident in Chicago

Though the larger corporations are moving slowly in the matter of their own subscriptions in the Chicago district, confidence is supreme that they will rise to the occasion before the drive is over. In making this statement, S. J. Llewellyn, president Interstate Iron & Steel Co., and chairman of the Iron and Steel Liberty Loan Committee, sets a good example by announcing that his company will subscribe an additional $100,000, making $250,000 for this issue.

The employees of all plants continue to do splendidly. The local committee is anxiously awaiting an allotment from the Republic Iron & Steel Co., whose total purchase is $7,000,000, none of which has been apportioned to Chicago as yet. Action on the part of some other big companies located elsewhere is hoped for also. The division handling the brass trade, which also looks out for the old material trade, of which Samuel Deutsch, Ohio Iron & Metal Co., is vice-chairman, has gone over the top.

E. P. Welles, chairman Machinery Division, is receiving more satisfactory returns from houses in other cities which maintain branch offices in Chicago. Of the quota of $6,800,000 which Mr. Welles' committee is to raise, $5,800,000 is in sight, and the workers are still going strong. The employees of the Western Electric Co. plant at Hawthorne, near Chicago, have subscribed $1,500,000, and have not closed.

The International Harvester Co., Chicago, which comes in the machinery division, and its employees have so far subscribed $2,650,000. This includes what the company has alloted to Chicago from its large general subscription.

Sickness has interfered with the work, and the tabulating is proceeding slowly. In the case of the Machinery Committee, its accountant was taken ill and the subscriptions are therefore being sent direct to headquarters. What the Illinois Steel Co. will report has not yet been disclosed, as its work is not completed.

Detroit Passes Quota

DETROIT, Oct. 18.—With a suddenness which completely surprised even the executive committee, Detroit passed its $73,387,980 quota Thursday noon. For the fourth successive time it is the first city of over 300,000 population to pass its goal. With the announcement of an additional $5,000,000 subscribed by the Ford interests, following closely a $3,200,000 purchase of the Dodge interests, Detroit passed its quota on the ninth working day of the campaign. The campaign was continued the two remaining days of the week, however, and as nearly as can be estimated, well over $8,000,000 was raised.

The Ford subscriptions, which totaled $15,000,000, are divided as follows: $6,000,000, Ford Motor Co. corporation subscription; $3,000,000, Ford Motor Co. employees; $2,000,000, Henry Ford & Son; $1,000,000, Henry Ford personally; $3,000,000 to 30 branches in the country. This last is not credited to Detroit. Dodge Bros. made a corporation subscription of $1,000,000, its employees added another million, Horace Dodge and John Dodge each took $500,000 personally, and Mrs. Horace Dodge and Mrs. John Dodge $100,000 each.

Employees of the American Car & Foundry Co., 10,000 in number, bought $1,500,000 in bonds. Ford Motor Co. employees raised $3,000,000. The largest per capita subscriptions were reported in machinery and tool making concerns, in some cases running as high as $250 per employee.

Among the larger subscriptions not reported in THE IRON AGE last week are:

Michigan Alkali Co., increased its subscription to $1,000,000 and its employees' subscription to $300,000; Michigan Copper & Brass Co. and Michigan Malleable Iron Works each added $100,000; Burroughs Adding Machine Co. additional $250,000, employees $440,000; Charles A. Strelinger Machine Co. increased subscription to $35,000; Gear Grinding Machine Co. doubled subscription to $12,000; Detroit Pressed Steel Co., with $173,550, and Automatic Screw Products Co. with $45,650, both doubled last subscription; Northway Motor & Mfg. Co., $113,700, three times its last record; Ireland & Mathews Co., $50,000; Buhl Sons, an additional $75,000, quadrupling its first mark; Timken-Detroit Axle Co., $250,000, employees $952,700; Lincoln Motor Co. employees, $471,350; Continental Motor Co., $260,000, employees $235,000; Detroit Twist Drill Co. and employees $85,000; Detroit Pressed Steel Co., $75,000, employees and officers, $61,650; General Aluminum & Brass Mfg. Co. employees, $66,200; Truscon Co., $65,000; American Blower Co., $54,300; McCord Mfg. Co., $50,000; American Radiator Co., $50,000; Zenith Carburetor Co. employees, $46,000; Jeffrey-DeWitt Co., $40,000; Detroit Gear Machine Co., $33,750; Michigan Sprocket Chain Co., $30,000; Kales Stamping Co., $26,000; Michigan Stove Co. officers, $25,000; Detroit Lubricator Co., $25,000; Cadillac Motor Co., $1,487,285 for corporation and employees; Fisher Body Co., additional $500,000, total $1,000,000; Michigan Smelting & Refining Co., additional $150,000, total $250,000.

Coke Workers Active

UNIONTOWN, PA., Oct. 12.—The Connellsville coke regions are doing their full duty by the Liberty loan campaign. A complete canvass is being conducted among the workmen and operators are placing their subscriptions through the coal and coke committee, of which R. M. Fry is chairman. The coke industry has been assessed $4,000,000, half of Fayette County's quota and that sum has been equally divided among

the corporations and their workmen. To date $1,500,000 has been reported from corporate subscriptions. The workmen's total it is expected will probably aggregate several hundred thousand dollars more than the assessment.

M. M. Cochran, lawyer, banker and coal operator, is held directly responsible for more than $500,000 in sales. He subscribed for $130,000 and directed the purchase of $200,000 by the Washington Coal & Coke Co. and $50,000 each by two national banks, of which company and institutions he is president. In addition, Mr. Cochran made a personally conducted canvass of Dawson, his home town, and mainly through his efforts, the village has subscribed $112,000, five times its quota.

Subscriptions for $100,000 each were taken by Harry and George Whyel, principal owners of the Consolidated Coal & Coke Co.; C. L. Snowdon, of the Snowdon Coal & Coke Co., $100,000; W. J. Parshall, a coal operator, placed $120,000.

Birmingham Continues Drive

BIRMINGHAM, ALA., Oct. 14.—Birmingham passed the second week of the fourth Liberty loan with nearly $7,000,000 of the quota of $9,300,000 raised and it is expected the quota will be more than raised this week. The principal subscriptions of the week were $1,250,000 by the Tennessee Coal, Iron & Railroad Co.; $250,000 by the Sloss-Sheffield Steel Co. and $60,000 by the Alabama Co. In any number of cases former subscriptions were doubled. A feature of the drive has been a number of subscriptions made by convicts working in the coal mines. Some of these have been made by life-termers. The individual mine workers, furnace men, steel workers, railroad and shopmen have come up splendidly. Among the subscriptions of the week in addition to those mentioned above are: Crane Co., $40,000; Semet-Solvay Co., $40,000; United States Cast Iron Pipe & Foundry Co. employees, $20,200; American Steel & Wire Co., additional $36,000, making $88,000 in all; Hickman-Williams & Co., $10,000; Alabama Fuel & Iron Co., $15,000; Geo. G. Crawford, additional $1,000. Following totals came from industrial districts; Ensley, $462,000; Fairfield, $6,450; Pratt City, $3,550.

Steel Mills Respond

YOUNGSTOWN, Oct. 14.—Up to Saturday Sept. 12, Youngstown had collected $13,022,300 of its quota of $15,000,000. Of this amount $7,734,800 was collected in the steel mills from the men, with $3,287,500 contributed by the manufacturing plants. Subscriptions of the men in the mills follows:

Youngstown Sheet & Tube Co.	$3,000,000
Republic Iron & Steel Co.	1,600,000
Carnegie Steel Co.	1,015,000
Brier Hill Steel Co.	1,025,000
Republic Rubber Corporation	200,000
Sharon Steel Hoop Co.	150,000
Truscon Steel Co.	127,000
Gen. Fireproofing Co.	117,800
United Eng. & Foundry Co.	100,000
From other plants	400,000
Total	$7,734,800

Milwaukee's Metal Group

MILWAUKEE, WIS., Oct. 12.—The metal trades group of the Milwaukee committee on Fourth Liberty Loan has reached its quota of $7,694,100 and is now endeavoring to attain a large percentage of over-subscription. Milwaukee County was divided into three sections for the purposes of solicitation, the minimum allotment for each group being: North side, $2,464,000; south side, $2,689,100; West Allis and West Milwaukee, $2,541,000. Each district has passed its mark. The county in general has absorbed 95 per cent of its minimum quota up to this time and confidence is expressed that the allotment of $33,000,000 will be exceeded by a considerable margin. The epidemic of Spanish influenza now raging in Milwaukee and elsewhere has been responsible for some delay in the work of solicitation, both from the standpoint of workers and subscribers. Among the larger subscriptions reported in addition to those noted in the last week's issue of THE IRON AGE are:

A. O. Smith Corporation	$500,000
Worden-Allen Co.	150,000
Cutler-Hammer Mfg. Co.	150,000
Bucyrus Co.	125,000
National Brake & Electric Co.	100,000
Milwaukee Corrugating Co.	100,000
Kempsmith Mfg. Co.	100,000
Globe Seamless Steel Tubes Co.	100,000

Buffalo Subscriptions

BUFFALO, Oct, 14.—S. B. E. McVay, vice-chairman of the Iron and Steel Committee of the fourth Liberty loan at Buffalo, reports that the iron and steel men are within reaching distance of their goal. Some of the larger amounts subscribed by the companies and firms assigned to this committee are as follows:

Lackawanna Steel Co.	$500,000
Rogers-Brown Iron Co.	300,000
Seneca Iron & Steel Co.	200,000
Donner Steel Co.	200,000
Wickwire Steel Co.	100,000
And T. H. Wickwire, T. H. Wickwire, Jr. and Ward Wickwire	100,000
Lackawanna Bridge Co.	150,000
Atlas Crucible Steel Co.	150,000
Atlas Steel Casting Co.	100,000
Sizer Forge Co.	100,000
Buffalo Union Furnace Co.	200,000

Secretary Moll of the committee states, in placing the record of the employees of the Rogers-Brown Iron Co., that 528 men, out of 540, have bought, through the company, a total of $91,850 of bonds, an average of $174 per man. This amount by the employees is in addition to the Rogers-Brown Iron Co.'s subscription of $300,000 and the subscription of $59,000 by the executives of the company.

L. R. Cooper, chairman of the Sheet Metal, reports subscriptions of $857,000 by his committee to date, or $7,000 over the amount alloted, and chairman Harry Roblin of the Scrap Metals Committee reports a total of $337,000, an excess over the committee's alloted quota of $325,000 and states that the committee expects to bring its total to over $400,000.

Liberty Loan Progress

New England totals in the Fourth Liberty Loan are showing a large increase over those of the preceding loan. One of the most popular methods in New England is that carried out by the Aetna Life Insurance Co., Hartford Conn. Through this company, the employees of many Connecticut plants subscribe on a special partial payment plan. Some of the leading subscriptions reported by this company to Oct. 12 are: Hartford: Colt's Patent Fire Arms Mfg. Co., $368,000; Capewell Horse Nail Co., $70,350; Henry & Wright Mfg. Co., $35,600; Billings & Spencer Co., $67,500; Whitney Mfg. Co., $163,700; Bristol, Conn.; Wallace Barnes Co., $25,000; Bristol Brass Co., $11,000; others reported are Eagle Lock o., Terryville, $35,000; Lake Torpedo Boat Co., Bridgeport, $170,000; Stanley Works, New Britain, $145,000; Cornwall & Patterson Mfg. Co., Bridgeport, $11,900.

Some recent reports in Bridgeport, where the canvass is not complete, are: Union Metallic Cartridge Co., $471,700; Bullard Machine Tool Co., $304,850; Crane Co., $297,300; Remington Arms Co., $292,450; American Graphophone Co., $197,500; American Chain Co., $90,000; American & British Co., $66,000; American Shear Co., $55,300; Eastern Malleable Iron Works, $44,750; Curtis & Curtis, $29,300; Bassick Co., $31,000; Bilton Machine Tool Co., $25,650.

In New Haven, the Marlin-Rockwell Co. and its employees have subscribed $500,000. The same company has pledged $45.000 in Plainville, $150,000 in Norwich, $150,000 in Philadelphia and $50,000 in New York.

In Waterbury, Conn., some of the subscriptions to

Oct. 12 are: Chase Rolling Mill, $100,000; Chase Metal Works, $100,000; Waterbury Mfg. Co., $100,000; Plume & Atwood Co., $75,000; Waterbury Brass Goods Co., $50,000; American Metal Hose Co., $50,000; Randolph-Clowes Co., $50,000; Manufacturers Foundry Co., $30,000; American Pin Co., $30,000; Waterbury Buckle Co., $30,000; Berbecker & Rowland Mfg. Co., $25,000.

The Torrington, Conn., plant of the American Brass Co. has subscribed $150,850. Other Torrington pledges are: Progressive Mfg. Co., $9,500; Standard Co., $39,550; Hendey Machine Co., $48,100; Turner & Seymour Mfg. Co., $27,800; Union Hardware Co., $32,350; Torrington Mfg. Co., $9,250; Excelsior Needle Co., $47,150; Fitzgerald Mfg. Co., $4,100.

Steelton, Pa., was the first town in the central Pennsylvania district to over-subscribe its quota in the fourth Liberty loan drive. This was due to the big subscriptions taken by employees of the Steelton plant of the Bethlehem Steel Co., who to Oct. 17, had subscribed over $400,000. Steelton's quota was $805,000 and the town has already subscribed $1,000,000.

Employees of the Harrisburg Pipe & Pipe Bending Works, Harrisburg, Pa., have subscribed $400,000 worth of Liberty bonds of the fourth issue. This is double the third loan sales and does not include the subscription of the company itself.

The officers and employees of the Berger Mfg. Co., Canton, Ohio, completed their Liberty campaign in 4½ days, when they reached 100 per cent subscription, and all, accompanied by two bands, marched through the business section of the city and listened to an address at the courthouse by Judge Henry W. Harter, chairman of the fourth Liberty loan committee of the district. The parade was a mile long and had many original features.

The Pangborn Corporation, Hagerstown, Md., has gotten out some very effective bulletins in promoting its Liberty loan campaign. A prize of $50 will be awarded to the department getting the highest subscription.

The Liberty loan is receiving hearty support from the industrial interests throughout New Jersey. At Jersey City, the Joseph Dixon Crucible Co. has subscribed $250,000; Joseph T. Ryerson & Son, $50,000; the Crucible Steel Co., $50,000; Ames & Co., manufacturers of spikes, etc., $10,000. A 100 per cent subscription from employees is expected at the plant of the Snead & Co. Iron Works, with a present total of over 95 per cent.

Employees at the works of the New York Shipbuilding Co., Camden, N. J., have subscribed $450,000, the company has subscribed $250,000. The Victor Talking Machine Co. has subscribed $200,000. Dr. C. F. Taylor, service director, Pusey & Jones, is in charge of the loan campaign at the New Jersey and Pennsylvania shipyards of the company. Thomas A. Major is in charge of the campaign at the plant of John A. Roebling's Sons Co., Roebling, near Trenton.

Workers at the Philadelphia shipyards of the Government have subscribed over $1,700,000. The Cumberland Valley Railroad Co. shops at Chambersburg, Pa., record a 100 per cent subscription. At Pittsburgh and vicinity the following subscriptions have been received: Pressed Steel Car Co., $500,000; 700 employees, Lockhart Iron & Steel Co., $125,000; Fort Pitt Malleable Iron Co., $70,000; every one of 1069 employees of the Continental Works of the National Tube Co., has subscribed, with a total of $163,800; 991 employees of the American Steel & Wire Co., $183,000; 611 employees of the Braddock Stove Co., $80,000; 750 employees of the McClintic-Marshall Co., $101,000; 292 employees, Sterling Steel Foundries, $43,850; employees of Union Steel Castings Co., $135,350; employees of the Edgewater Steel Casting Co., $167,250; Des Moines Iron & Steel Co., $40,000. Employees of the Westinghouse Electric & Mfg. Co., with a quota of $5,000,000, have subscribed over $4,423,800, and employees of the Union Switch & Signal Co., with quota of $579,000, a total of $609,900; employees of the Mesta Machine Co., $375,000, every employee taking a bond. Every employee of the Duquesne Foundry Co., has subscribed to the loan. The total subscriptions of the Jones & Laughlin Steel Co., including officers, employees, subsidiary companies and interests, are $7,000,000.

Large Cleveland Subscriptions

CLEVELAND, Oct. 14.—Cleveland subscriptions during the second week of the Liberty loan were approximately $35,000,000, bringing the total up for the first two weeks to about $60,000,000, or only a little more than one-half of the total quota of $112,000,000. However, pledges made to bond salesmen which have not been converted into actual subscriptions by making the first payment at the banks will amount to several million dollars more. New appeals are being made to those who have already subscribed to "buy more bonds—double up."

Large subscriptions were made during the week by iron ore and pig iron interests, steel plants, machinery builders and other manufacturers in the metal working field. Spurred to do their share by the efficient plant bond sale organizations shop employees are responding very liberally. Many plants have already exceeded their quota but are continuing the work among their men. Over 700 companies, largely in the manufacturing field, and including many of the larger employers of labor, have reported to the industrial sales committee that they have reached their quota and have been awarded the 100 per cent honor emblem. One company, the Cleveland Twist Drill Co., with a quota of $120,000, secured subscriptions amounting to $130,000 in its plant in two and one-half days and expects to reach $180,000 before the campaign closes. The larger subscriptions last week include the following:

Pickands, Mather & Co., $1,100,000; allied interests, Interstate Steamship Co., $750,000; Toledo Furnace Co., $650,000; Total, exclusive of individuals and employees, $2,500,000.

M. A. Hanna & Co. and associated interests	$1,700,000
Otis Steel Co.	750,000
Standard Parts Co.	600,000
Hydraulic Pressed Steel Co. and Cleveland Welding & Mfg. Co.	500,000
Pittsburgh Steamship Co.	500,000
National Malleable Castings Co.	500,000
Samuel Mather	500,000
Brown Hoisting Machinery Co.	350,000
Upson Nut Co. employees	325,000
Bourne-Fuller Co.	200,000
Warner & Swasey Co.	200,000
Upson Nut Co.	200,000
Standard Parts Co. employees	150,000
Union Rolling Mill Co.	150,000
Aluminum Castings Co. employees	103,000
Park Drop Forge Co.	100,000
Van Dorn Iron Works Co.	100,000
Strong, Carlisle & Hammond Co.	100,000
Republic Structural Iron Works	100,000
Peerless Motor Car Co.	100,000
Bialosky Bros. & Co.	100,000
Lake Erie Iron Co.	100,000
Motch & Merryweather Machinery Co.	100,000
Cleveland Metal Products Co. employees	100,000
Cleveland Steel Co.	100,000
Cleveland Twist Drill Co.	100,000
Alliance Machine Co., Alliance, Ohio	100,000
Browning Co.	80,000
Cleveland Machine & Mfg. Co.	75,000
Aluminum Castings Co.	75,000
Interstate Foundry Co.	75,000

Steel Corporation Subscription

After the meeting of the finance committee of the United States Steel Corporation Tuesday Judge Gary announced that the corporation had decided to subscribe for $10,000,000 additional for the fourth Liberty loan. The original subscription was for $40,000,000.

The American Association of Engineers announces publication of its first directory. The book lists 2204 members alphabetically, geographically and according to professional work. It is correct to July, 1918. A copy is obtainable at a cost of $2 from the American Association of Engineers, 29 South La Salle Street, Chicago.

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If Peace Came—

The iron and steel and metal-working trades came up suddenly in the past week against a peace proposal which set men thinking of things heretofore consigned to the indefinite future as though they might be just ahead. In a very deliberate way there has been for four years a running discussion of what is to become of trade, labor, finance, government and much else, when the war ends. Lately estimates of the time required to bring a military decision have ranged from six to nine months; but always there has been the thought of a period of negotiation, or, if not that, at least a period of conference among the Entente Allies, long enough to give industry some chance of readjustment. For a day or two in the rapid developments of the past week, there has been speculation as to what would happen in iron and steel and machinery trades if the war ended suddenly.

It has been common to say that in so many lines of consumption the use of iron and steel has been restricted in the past 18 months in favor of war needs, that when the call for war steel ceased, these other requirements would come promptly to the front and keep the mills running. Railroad requirements, it is well known, have been put aside in favor of requisitions from France, and car and locomotive works, it has been assumed, could be kept busy for many months on these postponed orders. Building, except for war purposes, has long been dormant, and the steel tonnage that would be released in that line under peace conditions is thought to be large. But in all that has been written concerning these postponed demands, nothing has been said as to the price basis on which peace business could be got upon the books of the steel companies, nor of the time that would be needed for buyers to make up their minds that the reduction from a war price level was sufficient to justify free contracting for steel. It is this time element which has come prominently into the account in the thinking of the past week. If war work stops and peace work does not come promptly to the rescue, what will happen in the interval and how long must mills and machine shops wait? That question has come up and it has not been easy to answer.

It is well known that the Government has given guaranties covering a wide range of operations in war materials. These would protect manufacturers against loss, but naturally they would not insure the completion of all the contracts under which munitions are now being manufactured. At the same time it is to be considered that, until an international agreement for limitation of armament is formulated, the Government would be justified in accumulating a reasonable reserve of war materials. Steel companies would be chiefly affected in their operations on shell steel, as the Government's shipbuilding operations would go on unchecked so far as merchant ships are concerned, while its railroad buying might even be increased. That export demand would spring up, especially from neutral countries, seems well assured, though here the question of prices would figure largely. Speaking generally as to steel, it is to be considered that to a certain extent material for peace uses could be taken in place of that ordered for war, and this would apply particularly to steel for France.

The case of the machine shops working on munitions contracts differs from that of the steel companies in that there can be little or no substitution for the work in hand. Cancellation and reimbursement provisions were put in these contracts by the Government. Compensation would be allowed, particularly on tools, jigs and fixtures specially provided for Government work. In some cases buildings have been erected by the contracting companies without guaranties; on the other hand, in many instances the Government has made advances of money for such new construction. As to all the arrangements for indemnity in case of cancellation, it is to be said that while these safeguard the manufacturers against loss on the contracts themselves they furnish no answer to the question as to the employment of working forces after the shell work stops. Inevitably a certain amount of shock will come from the taking away of war work from many thousands of employees.

How the Government price-fixing powers would be exerted in stabilizing iron and steel markets in the event of a sudden peace is a matter of no small importance. It is not to be expected that the price-fixing function would be suddenly abdicated. The Gary dinner period after the panic of 1907 demonstrated that price maintenance in times of depression is attended by limited consumption.

In the longer or shorter disturbance of industry caused by the ending of the war with the ordinary concomitants of a panic would be a check on business.

However, concerning the above and other speculation on the effect of a sudden ending of the war it is to be said that since Tuesday morning it has resumed its place among matters to be reckoned with in due time, but not in the immediate future.

Looking Beyond the War

It is worthy of note that the week which brought the last German maneuver for peace has been marked in Washington news by more attention to plans for the after-the-war period. Last week we printed the Overman bill providing for the appointment of what it calls the Federal Commission on Reconstruction. The Weeks resolution for a joint Congressional committee on reconstruction has the same aim. Elsewhere is given the synopsis of the pamphlet just issued by the Bureau of Foreign and Domestic Commerce dealing with the problem of "economic reconstruction." The United States has been quite behind all the European belligerents in giving attention to the problems in industry which must be met when peace comes. Having been so unprepared for war, the American people have had to give themselves over so completely to feverish war activities that there has been little room for thought, much less for action, looking to the readjustments that must come with the ending of the war.

Burwell S. Cutler, chief of the bureau which prepared the report, takes pains to say to those who think nothing has been done at home looking to the future, that more has been worked out against the day of peace than is commonly reckoned. He speaks of the greatest of all preparations that could be made, namely the construction and organization of a large merchant navy backed by scores of efficient shipyards and dry docks. Naturally the Webb-Pomerene bill and the Federal Reserve Board and banking system will be thought of in the same connection. Something has been done also by the Federal Board for Vocational Education, and there has been excellent work in planning for the future of crippled soldiers. While Mr. Cutler does not mention it, one of the great factors in the national preparation for the period after the war is the liberal education hundreds of able men have had at Washington in helping to work out the great economic and industrial problems with which the War Industries Board has wrestled. Not only the export trade but domestic trade in all its ramifications has thus been studied in a practical administrative way by some of the best minds in American business life. It is to be said also that the Department of Commerce has today a better information service concerning materials, markets and economic conditions in foreign countries than at any time since it was created.

Mr. Cutler's report refers to the "practically unanimous opinion" that the war will bring about a great extension in Government control of or participation in trade and industry in belligerent countries. This will be especially a feature of the period of reconstruction, though doubtless the extent to which it will be made permanent will vary in the different countries. National control of important raw materials and other essential products has been emphasized in every report that has been prepared by the European commissions on reconstruction. Mr. Cutler says that the unsettling of the established mechanism of production and distribution in the leading European countries due to the war has led in every case to a careful examination of existing structure and he adds:

> As the war progressed there has developed the general impression that the economic régime after the war will be fundamentally different from the old individualistic system and that it will require new facilities and organs for its proper operation. Thus we find that in two of the most important belligerent countries of Europe—Great Britain and Germany—there are two parallel movements in the work of preparation: The government is creating new instruments or overhauling the old in order to be ready to meet the new conditions created by the war, and private organizations in commerce, industry and finance are getting closer together and co-ordinating their efforts, so as to present a solid front to the anticipated onslaught of their chief rivals.

What is called for now is an American program for meeting the political and industrial revolution produced by the war—a revolution affecting in greater or less degree every country in the world. It is in no way to the credit of the United States that it has lagged behind all the belligerent countries in preparing for a period in which its influence upon the world trade and world finance should be paramount.

Equalizing Labor Conditions

One of the puzzles of the war has been speculation as to labor migration tendencies afterward. The idea of a "flood of immigration" into the United States after the war gained such vogue that nearly two years ago Congress passed the "literacy test" for immigrants after the principle had been vetoed by three different Presidents. On the other hand we have it that the Central Powers are strongly disposed to put a ban upon emigration from their borders after the war.

Clearly one result of the war will be the setting up of a number of independent states, composed of peoples from whose ranks much of the American immigration of the past has been recruited. In European states, particularly in the Balkans, political conditions in the main will be greatly improved.

The migration of labor is the result of differences in political and industrial conditions. Migration tends to equalize industrial conditions, though of course it does not to any extent tend to equalize political conditions, the reverse being frequently the case. So closely has the tendency to equalize industrial conditions worked out in the past that with the ups and downs in industry in the United States many men have crossed back and forth on the Atlantic, according as they regarded employment and other conditions here to

be better or worse than at home. In the Connellsville coke region this practice has been particularly observed.

Before the war political and industrial conditions in the United States were so favorable that there was a constant influx. In the two fiscal years prior to the war the average excess of arrivals over departures was about 60,000 persons per month. In the next three fiscal years, to July 1, 1917, the total excess of arrivals over departures was only 472,000. In the following fiscal year there was a deficit of 184,000; so that in four years the net excess of arrivals has been less than 300,000, equal to the average influx in five months preceding the war. The accumulated deficit, if the term may be permitted, was about 2,600,000 during the four years.

This deficit has been an important factor in making the lot of the workman in the United States to-day so very favorable as to wage rates and working conditions. If migration were controlled only by industrial conditions, the course after the war would be for immigration and labor employment to seek an equalization in the United States. There would be an influx of workmen into the United States until labor became so scarce abroad and so plentiful here that conditions of employment would leave little choice to the man.

Political conditions, however, which were substantially unchanged for many years prior to the war, will undergo great changes abroad, and that element will therefore be an important one, though it will hardly express itself at once. The terms of peace may outline in general terms what political conditions are to obtain in various European countries, but the definite working out of the program will require time. Meanwhile the workman will have to make an appraisal of what the promised political conditions will mean for him. Even as to the opportunity here he will require time for an appraisal, for he certainly will recognize that employment conditions that obtain in the United States when the country is at war will not necessarily obtain afterward.

It seems improbable, therefore, that there will be any large movement at the outset, and if so the United States will continue to miss the tide of immigration to which it was accustomed before the war.

That a freight rate advance averaging 10 per cent and affecting a large territory and a large tonnage could be put in force without a ripple of discussion or even yet in many cases the foreknowledge of shippers is a commentary on the times. The force of Government control and an accepted belief in measures as transitory have removed resistance. The ever-rising prices also are taken for granted. To be sure, the basis of readjustment arises out of the successfully contested case of a Cincinnati steel maker and carries the weight of an Interstate Commerce Commission decision. But the feature of the advance, which becomes effective Nov. 1 except for shipments from Buffalo—these to be established about the first of the year—is that the special commodity rates have in general been eliminated and the classification grouping strengthened sufficiently to make a change back again more or less difficult. If there were the certainty of a return to two rates, one for domestic and the other for export shipments, the case might be different.

Heavy Steel Production at Last

The production of steel ingots in September appears to have been at the rate of very nearly 47,000,000 tons per annum, a figure which has frequently been mentioned in recent months as representing approximately the capacity, in view of the production actually attained in 1916 and the new construction that has been completed.

Two things occurred. First, there was a large increase, from August to September, in the output of the 29 companies which make monthly reports of the production; second, the gathering of statistics of the whole trade for 1917 showed that in that year the 29 companies represented 85.10 per cent of the total output, whereas in 1916 their output had been 88.14 per cent of the total, and the higher percentage has hitherto been used in estimating the country's total output on the basis of returns from the 29. Thus all the outputs have been greater of late than commonly assumed, by the difference between 88.14 and 85.10.

The 29 companies reported for September an output of 3,200,438 tons of ingots, and if this was 85.10 per cent of the total, the total was 3,760,000 tons. On the basis of 25 working days for September and 311 for the year, the rate in September was about 46,750,000 tons per annum. Production was about 43,700,000 tons in 1917 and 41,400,000 tons in 1916.

The chief thing favorable about the monthly reports is the heavy rate shown for September, 12 per cent in excess of the August rate. The total of the 29 companies in the first nine months of the year is 26,519,772 tons, which on the basis of its representing 85.10 per cent of the industry's output would indicate total production of 31,100,000 tons, or at the rate of only 38,900,000 tons for a year. It is a reasonable expectation that October will show steel production at a still better rate than that of September and that the rate will continue except for such curtailment as occurs by reason of winter weather.

The ingot statistics furnish a means of estimating the supply of finished rolled steel to consider in connection with the War Industries Board's repeated estimate that the half year's requirements are not under 23,000,000 net tons, and may be 25,000,000 tons. The 29 companies produced in the past three months 9,397,636 gross tons of ingots, suggesting that the industry's output was about 11,050,000 tons. Statistics compiled not long ago indicated that finished rolled steel output is running at 78 per cent of ingot output, and applying this factor and reducing to net tons there is about 9,650,000 net tons of finished rolled steel. Considering the improved rate of September, and the still more favorable promise of October, the half year's output may be taken as likely to equal 19,500,000 tons, with a possible 20,000,000 tons.

There will remain, therefore, a deficit of not

less than 3,000,000 tons. The presumption is that this full amount will not have to be cut off from consumption during the next twelve weeks, but that some of it already has been taken off lines that were figured in the original estimate at larger weekly or monthly tonnages than they have actually received. No doubt the war program contemplated giving every war activity the maximum amount of steel it could consume under the most favorable circumstances. The shipyards may have to draw at times on their reservoir of steel but their activities need not suffer. Likewise, there seems to be a surplus of forged material for shells beyond what the machine shops are currently able to finish, and this may also be drawn upon. Again, the domestic railroads are not being given as much steel as the Railroad Administration desires and they will enter the winter with less reserve capacity than would be considered perfectly safe. On the other hand, the prospect is that General Pershing and our Allies will get practically all the steel they need.

Safety Rules for Crane Operators

The safety committee of the Association of Iron and Steel Electrical Engineers in its report on rules for safe operation of electric cranes presented at the Baltimore meeting of the association, Sept. 11, pointed out that the law on this subject implies and in some cases demands, that hazards of every situation employees are brought in contact with shall be made known to them before they begin their work and that employees shall be instructed how to do their work so that no injury may befall them or their fellow workmen. Supplying safety rules is emphasized as a safeguard requirement, and moral obligation, in its opinion, requires that it be shown proper effort has been made to acquaint employees with them.

Unless employers make strict compliance with safeguarding requirements, the report holds that claimants can refuse to accept the compensation prescribed by law and can call on the courts to make satisfactory adjustments. To avoid too much safeguarding by law makers, which it fears would be burdensome to employers and would tend to make employees unconcerned about avoiding accidents, also to guard against imposition, it advises that the law be so fully complied with that no just grounds for refusing to accept the compensation prescribed could exist. The committee believes that the requirement that employees be instructed as to the hazards of their work and how to perform it safely can be most effectively complied with by supplying each employee with a printed copy of proper safety instructions.

"Emergency War Training for Oxy-Acetylene Welders" is the subject of bulletin 11 issued by the Federal Board for Vocational Education, Washington, D. C. The pamphlet is divided into two parts. Part I is devoted to a general discussion of welding and cutting, including developments and applications in industry and war. Part II covers a short direct course of instruction intended as the basis of the training given under Army auspices but approximating the demands and requirements of similar work in civilian employ. The course is outlined on a basis of a 3 weeks' period, 8 hrs. per day and 5½ days per week.

Mosquitoes are as great a factor in the destruction of shipyard efficiency and morale as an epidemic of disease, declares George J. H. Cushing, assistant entomologist for the State of New Jersey, in a report to the United States Shipping Board. He reports, however, that the mosquito scourge in the New Jersey shipyards on the Delaware River is under control.

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"The Iron Age" and Its Readers

Reviews of the various papers read at the foundry association meetings last week at Milwaukee will be published from time to time as space and the opportuneness of the subjects warrant. In the account elsewhere in this issue brief outlines of some of them are given. One service which this journal strives to render in the case of such contributions to technical and trade associations is to direct attention to their salient points. The engineering monograph as commonly written often hides the really new or important detail, and even when it is readily available in pamphlet form there is need of illuminating it for the busy executive and engineer submerged in the present day flood of literature.

The recapture of the Lorraine iron mines of the Briey district is becoming a greater probability daily as Pershing's forces continue their advance—a potent factor in the evident increasing Hun desire for peace. The vital importance of these Lorraine mines to a German continuation of the war was clearly explained in THE IRON AGE of Sept. 19.

New Interest in After-the-War Conditions

Report of the Bureau of Foreign and Domestic Commerce Shows That the United States Is Much Behind Europe in Planning for the Reconstruction Period

WASHINGTON, Oct. 15.—In line with the increasing interest that has been aroused in the question of reconstruction after the war, the Bureau of Foreign and Domestic Commerce has issued an analysis of the work already done on this question by the principal belligerent countries of Europe. The pamphlet is an indictment of our own disregard of this vital problem, for it details a long series of constructive programs which have been worked out by friend as well as enemy, to meet the new conditions that peace will bring.

In submitting the report to Secretary Redfield of the Department of Commerce, Burwell S. Cutler, the chief of the bureau which prepared it, points out the imperative necessity of taking steps in this country to meet the same problems. "The outstanding fact, under observation," he writes, "is the recognition in every land and by all statesmen of the problem called 'economic construction.' But of more immediate importance is the fact that England, France, Italy, Germany, and Austria are making preparations to resume their peaceful economic life, with improved facilities for foreign trade, with a national supervision of the use of natural resources for the benefit of their own citizens, and with assistance from the state.

Individual National Interests

"While I realize that many plans advocated or adopted in the foreign countries are unsuitable or even unnecessary for the United States, I feel impelled to point out that those plans might involve prejudice to the interests of the United States in foreign fields if they should be administered in a narrow spirit or if the United States should fail to make plain its own interest in them. Although the various countries will, for a while, undoubtedly work toward economic self-sufficiency and toward the elimination of enemy interest in the exploitation of their resources, it is essential that each of the Allied countries should frame its program and the administration of its program with full realization of the extent to which the interests of all the other Allied countries are involved. It is for us, to stand ready to enter, at the proper moment, upon an understanding which will show our appreciation of the community of interest in the larger aspects of trade and economic intercourse after the war, and which will be in harmony with the motives underlying our participation in the war.

Some Work Already Done at Home

"It may not be out of place to point out that our own Government has already put certain laws on the statute books which will prove of great assistance in the after-war period, and that many of our Government offices have done much, either directly or indirectly, in contemplation of the reconstruction period. The Government's greatest preparation for after-war trade is the construction and organization of a large merchant navy, backed by large and efficient shipyards and dry docks. We have, of course, the Webb-Pomerene bill, authorizing our exporters to combine for foreign trade purposes. Our Federal Reserve Board and banking system have wide leeway in foreign trade banking matters and are alive to the needs of our trade and are meeting them. We have now our Federal Board for Vocational Education, working on problems that are at the very base of our reconstruction work. The War Department also has devoted attention to the future of crippled soldiers. The Department of Labor is contributing to numerous aspects of the after-war problems; the valuable services now being rendered to make the labor supply more mobile and correspond to industrial needs will undoubtedly continue during the reconstruction period. In the Department of Agriculture, and very notably in the Bureau of Mines and the Geological Survey in the Department of the Interior, no less than in the Bureau of Standards and the Bureau of Foreign and Domestic Commerce in the Department of Commerce, important steps have been taken in scientific work and research in preparation for the future.

Better Knowledge of Foreign Conditions

"This bureau has a far better information service concerning materials, markets, and legislation and economic conditions in foreign countries than ever before. The foreign staff of commercial attaches, trade commissioners, commercial agents, and special agents has been expanded, and we are now able to supply commercial and economic information with reference to Europe and the Far East—thanks to the ready appropriation by Congress of a special fund for Far Eastern work—that will approach the well-organized information service which we have had relative to South and Central America. This foreign commercial staff should now be even more increased. Published reports on German foreign-trade organization, on German trade and the war, tariff policies and trade restrictions, and extensive research with reference to raw materials and the commerce of foreign countries have been leading features of the bureau's work for the last two years. Similarly, the United States Shipping Board, the War Trade Board and the War Industries Board have done statistical research, particularly with reference to commodities for war purposes, which can not but be of value in organizing a national after-war program. In our own office we have continuously published in *Commerce Reports* material with reference to the reconstruction work of foreign countries. The State Department has long been engaged in drafting commercial treaties—work to which the comparatively new United States Tariff Commission is substantially contributing. The Tariff Commission is also doing important work in its recognized field of surveying various American industries with a view to ascertaining their tariff needs. All told, there has been a very considerable amount of quiet and effective work done looking toward the future.

Too Early to Lay Down Policies

"In England, judging from present comments on the work of the Committee on Commercial and Industrial Policy after the War, any present attempt to lay down complete and binding policies regarding the future is now being recognized as a waste of effort.

"What is important now is the assembling of facts, taking the basic steps to improve our educational, research and promotive organizations and contributing to clear thinking as to the questions involved. Sooner or later we must have a definite program in which work done and plans for the future based on known conditions affecting our future may be co-ordinated. I personally feel that the time is now ripe for some more centralized, concerted work to that end.

"Finally, I can not emphasize too strongly the importance of placing the direction of this work in a Government office whose functions are decidedly constructive. A constant sense of economic responsibility is required in the minds of those officials who shall seek to lead the nation successfully out of this world struggle."

The report itself goes into the details of the programs that have been worked out by Great Britain, France, Italy, Germany and Austria-Hungary. It also deals with the decision of the Paris Economic Conference of June, 1916. But it declares that the tendency to consider economic factors as retaliatory weapons is now far less pronounced than it was at that time. Attention is called to a "practically unanimous opinion"

that the war will bring about a great extension in government control of or participation in trade and industry in the belligerent countries.

Government Trade Control Inevitable

"Even in circles where such extension of Government powers is regarded as harmful," declares the report, "there is to be noted an implied admission of its inevitability, not only for the period of reconstruction, when it may be necessary for the protection of industry and commerce from a too sudden transition to normal existence, but also as a part of the normal economic life of the country. This is due largely to the realization that the ordinary sources of revenue will be insufficient to bear the enormous fiscal burden and that the Government will have to go into business to pay for the war. The old objections to a Government monopoly have lost some of their strength, partly on account of the recent tendencies toward combinations under private control and also because of the anticipated need of industry and trade during the period of readjustment after the war, while the results of Government control during the war may serve to disarm to some extent those who would otherwise be inclined to oppose the plan on the ground of inefficiency as an inevitable concomitant of Government control. The movement toward greater government participation in business may also be regarded as a reflection of the anticipated increase in the political strength of the labor element as a result of the war. It is interesting to note that this movement is meeting with some approval on the part of the German Agrarians, who are not unwilling to see the influence of the industrial and commercial interests weakened by government control.

"The extension of government functions in the economic field is intimately connected with two other ideas which owe their present prominence, if not their origin, to the war. These are (1) economic self-sufficiency as a political necessity, and (2) national control of important raw materials and other essential products. Both are receiving particular attention in Great Britain and Germany, in the former because of the great extent of the natural wealth in the British Empire, and in the latter on account of the comparative lack of such raw materials and products in Germany or even in central Europe."

Government Encouragement of Private Effort

But there is also noted in the report a vigorous plan for private exploitation of after-war opportunities. "This tendency will be found in the movement toward concentration in industry and finance in Germany and in Great Britain, in the establishment of new departments of commerce in the two countries, the Ministry of Reconstruction in Great Britain, and of a similar department in Germany. Plans for the reorganization of the consular service and technical education in Great Britain, the extension of waterways in France, Germany and Austria-Hungary, reorganization of credit institutions in Great Britain and France, and restoration of merchant marine are features of the same tendency.

All Opinions Subject to Change

"It is believed that the above tendencies are sufficiently comprehensive to account for most of the important measures proposed or adopted in the important belligerent countries, and it now remains to examine the more specific plans advocated and to indicate, as far as it is possible under the present circumstances, those that are likely to be adopted. It is hardly necessary to point out that all the opinions expressed must necessarily be of a tentative nature, subject to political and military developments which cannot be foreseen at present, but which may modify some of the most clearly defined tendencies and render futile some of the most advanced plans for economic reconstruction."

The report declares that the subject of government participation in economic life has probably been discussed more in the public press of Germany than in any of the other belligerent countries. In Great Britain the report finds a greater resistance to government dictation and suggests that this is due to the individualistic traditions of the commercial interests. Opposed to this is the attitude of organized labor in Great Britain, which even favors an increase in government control. In France the subject of temporary government control has been generally restricted to the establishment of monopolies. The various trade restrictions, such as export embargoes and import prohibitions, adopted during the war, have also served to emphasize the political importance of the control of essential products and have gradually developed an agitation for the national control of such products after the war."

American Influence Important

The report also deals at length with the various suggestions that have been made for economic alliances between the various countries after the war, but points out that the entry of the United States has done much to change the situation which dictated the terms of the Paris Confrence. Concerning the general preparations for the period after the war, the report says:

"Plans for trade and industry after the conclusion of peace have engaged the attention of the governments and of the industrial and commercial interests of the more important belligerent countries practically since the beginning of the war. It would seem as if the war, by disturbing the established mechanism of production and distribution in the most important countries of Europe, gave them an opportunity to make a careful examination of their economic structure and to make the necessary improvements. As the war progressed there has developed the general impression that the economic regime after the war will be fundamentally different from the old individualistic system and that it will require new facilities and organs for its proper operation. Thus, we find that in two of the most important belligerent countries of Europe—Great Britain and Germany—there are two parallel movements in the work of preparation. The government is creating new instruments or overhauling the old in order to be ready to meet the new conditions created by the war, and private organizations in commerce, industry and finance are getting closer together and co-ordinating their efforts, so as to present a solid front to the anticipated onslaught of their chief rivals."

Great Britain's Investigations

The report then deals with the government policy of Great Britain under the heads of "Department of Overseas Trade," "Development and Intelligence," "Ministry of Reconstruction," "Patent and Trademark Legislation," "Companies Act," and "Technical Education."

"Among private organizations in Great Britain," says the report, "the outstanding tendency has been toward co-operation and concentration—policies that are receiving considerable encouragement from the government, influenced more or less by similar economic tendencies in other countries, particularly in the United States. It is stated that the Board of Trade has sent representatives to some of the industrial centers to arouse interest in combinations for export trade. Some of the Board of Trade committees investigating various industries with a view to determining the changes that it may be necessary to make in their foreign-trade methods after the war have reported in favor of some form of combination or association for export trade for the following industries: Iron and steel, engineering, shipbuilding and marine engineering, electrical, and textile.

Policy in France

"As far as it is possible to ascertain from published sources, the French Government has not announced any definite plan for general economic reconstruction, probably owing to the fact that the restoration of the invaded regions is expected to engage the best efforts of the nation for some time after the conclusion of peace. A number of private organizations have been calling attention to certain shortcomings in French commercial methods and the lack of enterprise in the exploitation of colonial resources. The Association Nationale d'Expansion Economique has undertaken a comprehensive economic survey of the country, and the Comite Repub-

(*Continued on page* 999)

Iron and Steel Markets

NO PEACE PROGRAM

Speculation on the War's End, but Fullest Production

Influenza Affects Operations Most in the East—Advance in Bar Iron

What would come to the steel industry from a sudden ending of the war has been a large factor in the trade comment of the week, yet not a disturbing one. Generally the view is taken that apart from shell steel, in which an early peace would cause some cancellations, the materials now most in demand would show no great falling off. Government shipbuilding would go on and rail and railroad equipment contracts would keep many mills busy for months.

Under cancellation clauses, Government munition contracts could be cut down and the manufacturers reimbursed; yet it is pointed out that in a good many cases manufacturers made plant extensions for war work without any guaranty of reimbursement. In any event, compensating payments by the Government would not keep workers employed, and it is conceded that in some lines an early peace would cause unsettlement and a process of readjustment.

With the whole metal working industry so largely serving the Government, the bid for peace has had no effect on production, though undeniably it has caused many manufacturers to think more sharply concerning plans for the transition period.

The existence of Government price-fixing machinery is counted on to stabilize the market when war demand falls off; but there has been some evidence this week, particularly in pig iron and in old material, that buyers recognize the entrance of new possibilities into the situation.

At the same time the dominant note in the entire industry is the continued concentration of all effort on increased production of pig iron and steel, the belief being general that there will be a war demand for some months to come for all the steel that can be shipped to France.

Steel ingot production in September made a much greater gain than was shown in pig iron, companies representing 85 per cent of the country's capacity producing 3,200,000 tons, which is at the rate, for the whole industry, of nearly 47,000,000 tons a year. On that basis the shortage so long advertised from Washington is materially diminished.

Influenza has further cut down operations in eastern Pennsylvania plants, two plate mills having lost several turns in the week. In the Pittsburgh district the epidemic has been felt to a less extent, the leading interest suffering a loss of about 7 per cent in its working force. Indications are that the production records usual in October will suffer.

There is no abatement of the Government demand for shipments to France. A new order calls for 12,000 to 15,000 tons of portable track for France, or double the amount taken in the previous week for the same purpose.

A few Central Western implement manufacturers are not disposed to accept the $5 concession on steel bars, since it involves an agreement not to raise the price of their product for next year, and this they are not willing to give.

A $30 per ton advance in many sizes of bar iron, effective to-day, follows a general showing of losses in selling at 3.50c. per pound, but it is likely to bring a change in market conditions. In the face of three and four months' bookings, mills have been picking their business from large offerings for some time, but the higher price will now turn consumers who can substitute it to bars rolled from discard steel.

Rolling mills which shy at 2.90c. steel bar business have produced such bars at $25 per ton under conversion deals, the billets being bought and supplied by the bar consumer. Though such deals are hampered by a shortening supply of discard shell steel, bars thus obtained cost at mills about 3.65c. per pound.

The iron ore movement from Lake Superior will be nearly over by Nov. 1, according to present plans, or a month earlier than usual, and the total will probably fall 2,000,000 tons short of last year's. With pig-iron production increasing, stocks on Lake Erie docks and in furnace yards are likely to be considerably less next spring than in several years.

Pittsburgh

PITTSBURGH, Oct. 15—(*By Wire*).

President Wilson's declaration that "There will be no relaxation of any kind" in war preparations until Germany shall have accepted the President's peace terms finds ample backing in the increased pressure which has been been brought to bear on the steel industry for shipments of war steel, particularly shell steel, rails and plates. It is significant that last week the sheet manufacturers received the largest Government orders that they have had in any week of the war. Wire mills have also been asked to increase their output of shell rounds in the next 30 days. If there is any reflection of peace talk anywhere in the

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 15, 1918	Oct. 8, 1918	Sept. 17, 1918	Oct. 17, 1917
No. 2 X, Philadelphia	$38.85	$38.85	$34.40	$34.25
No. 2, Valley furnace	34.00	34.00	33.00	33.00
No. 2, Southern, Cin'ti	37.60	37.60	36.60	35.90
No. 2, Birmingham, Ala.	34.00	34.00	33.00	33.00
No. 2, furnace, Chicago*	34.00	34.00	33.00	33.00
Basic, del'd, eastern Pa.	36.60	36.60	32.90	33.75
Basic, Valley furnace	33.00	33.00	32.00	33.00
Bessemer, Pittsburgh	36.60	36.60	36.60	37.25
Malleable Bess., Ch'go*	34.50	34.50	33.50	....
Malleable, Valley	34.50	34.50	33.50	33.50
Gray forge, Pittsburgh	34.40	34.40	33.40	32.75
L. S. charcoal, Chicago	38.85	38.85	37.85	....
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	55.00	55.00	55.00	....
O-h. rails, heavy, at mill	57.00	57.00	57.00	....
Bess. billets, Pittsburgh	47.50	47.50	47.50	47.50
O-h. billets, Pittsburgh	47.50	47.50	47.50	47.50
O-h. sheet bars, P'gh	51.00	51.00	51.00	51.00
Forging billets, base, P'gh.	60.00	60.00	60.00	....
O-h. billets, Phila	51.30	51.30	51.30	....
Wire rods, Pittsburgh	57.00	57.00	57.00	57.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Common iron bars, Phila.	3.73	3.73	3.73	4.25
Common iron bars, P'gh.	3.50	3.50	3.50	....
Common iron bars, Chi'go.	3.50	3.50	3.50	4.50
Steel bars, Pittsburgh	2.90	2.90	2.90	2.90
Steel bars, New York	3.145	3.145	3.145	....
Tank plates, Pittsburgh	3.25	3.25	3.25	3.25
Tank plates, New York	3.495	3.495	3.495	....
Beams, etc., Pittsburgh	3.00	3.00	3.00	3.00
Beams, etc., New York	3.245	3.245	3.245	3.195
Skelp, grooved steel, P'gh.	2.90	2.90	2.90	2.90
Skelp, sheared steel, P'gh.	3.25	3.25	3.25	3.25
Steel hoops, Pittsburgh	3.50	3.50	3.50	....

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 15, 1918 Cents	Oct. 8, 1918 Cents	Sept. 17, 1918 Cents	Oct. 17, 1917 Cents
Sheets, black, No. 28, P'gh.	5.00	5.00	5.00	....
Sheets, galv., No. 28, P'gh.	6.25	6.25	6.25	....
Wire nails, Pittsburgh	3.50	3.50	3.50	....
Cut nails, Pittsburgh	4.00	4.00	4.00	....
Fence wire, base, P'gh.	3.25	3.25	3.25	....
Barbed wire, galv., P'gh.	4.35	4.35	4.35	....
Old Material, Per Gross Ton:				
Carwheels, Chicago	$29.00	$29.00	$29.00	$26.00
Carwheels, Philadelphia	29.00	29.00	29.00	29.00
Heavy steel scrap, P'gh.	29.00	29.00	29.00	27.00
Heavy steel scrap, Phila.	29.00	29.00	29.00	25.00
Heavy steel scrap, Ch'go.	29.00	29.00	29.00	25.00
No. 1 cast, Pittsburgh	29.00	29.00	29.00	27.00
No. 1 cast, Philadelphia	29.00	29.00	29.00	28.00
No. 1 cast, Ch'go (net ton)	30.36	30.36	30.00	20.00
No. 1 RR. wrot, Phila.	34.00	34.00	34.00	35.00
No. 1 RR. wrot, Ch'go (net)	30.36	30.36	29.75	29.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.00
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	7.00	7.00	7.00	....
Foundry coke, future	7.00	7.00	7.00	....
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	26.00	26.00	26.00	23.50
Electrolytic copper, N. Y.	26.00	26.00	26.00	23.50
Spelter, St. Louis	8.60	8.85	9.50	8.00
Spelter, New York	8.95	9.20	9.85	8.25
Lead, St. Louis	7.75	7.75	7.75	6.87½
Lead, New York	8.05	8.05	8.05	7.00
Tin, New York	81.00	82.00	78.50	61.00
Antimony (Asiatic), N. Y.	13.62½	14.00	14.00	15.00
Tin plate, 100-lb. box, P'gh.	$7.75	$7.75	$7.75	....

trade, it is to be found in a slight hesitation on the part of pig iron buyers as to commitments for next year.

There is apparently no apprehension among producers of iron and steel as to the effect which the coming of peace would have upon the industry. Although somewhat reluctant to anticipate peace conditions, steel interests admit that they see signs of a very active domestic and export demand the very minute that events make it certain that the mills will be able to accept such business. Particularly in rails, plates and structural material are there evidences that demand will continue at a good rate even during the readjustment period that must follow the conclusion of peace. The Government is expected to continue its shipbuilding and railroad construction programs without regard to peace, and this demand will support the market to a considerable extent.

Spanish influenza has been felt in the mills of the Pittsburgh district only to a limited extent. The leading interest lost through this cause 7 per cent of its working forces last week. Work at the coke ovens has also been slightly affected, but on the whole production continues at a very satisfactory rate.

Pig Iron.—The market continues inactive. There are many inquiries for all grades of iron, but sellers are referring buyers to Washington. Production continues at a good rate and October should equal, if not exceed, the excellent September record, unless influenza inroads increase. Some sellers seem to detect a slight hesitation on the part of consumers in contracting for iron for next year's delivery because of the peace talk, but this may be more fancied than real, as there have been many consumers who would gladly place their orders on the books for first half, if it could be done. No one seems to question that Government fixed prices will continue until Dec. 31, at least, even though peace comes before that date, and there is a suggestion that fixed prices would be continued for a period after peace is declared, so that business would be stabilized over the readjustment period. There is an inquiry in the market for 200 tons of cold blast charcoal iron for the making of chilled rolls.

Basic pig iron, $33; Bessemer, $35.20; gray forge, $33; No. 2 foundry, $34; No. 3 foundry, $33.50, and malleable $34.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh district being $1.40 per ton.

Billets and Sheet Bars.—The shortage of sheet bars has grown more acute, and as a result production of sheets last week was greatly reduced in some plants. The Government is keeping a close watch on the consumption of sheet bars, and no mill is permitted to use more than its share. Violation of this restriction has resulted in summary measures by the steel section of the War Industries Board. The situation as to billets continues as previously reported, there being no tonnages available except on Government direct order.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $47.50, and bars $51, forging ingots $73, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Plates.—Heavy shipments continue to go out to shipyards, car builders and other war plants, but there are no new features. Makers of plates are, of course, considering the possibility of an early end of the war, and prophecies are of an optimistic nature. The coming of peace would presumably bring no cessation in the building of ships, cars and locomotives, into which the bulk of the plate tonnage is going, and it would bring forth many inquiries from commercial users who have been denied supplies during the past six months or a year. We quote sheared plates at 3.25c., Pittsburgh mill, for fourth quarter.

Structural Material.—Orders continue to come from the Government, but no large projects are reported. It is known that there would be a post war demand for steel for railroad bridges, municipal construction, etc., but the extent to which general building work would be resumed is believed to depend very largely

on the labor situation, particularly the wages to be paid. Some incline to the view that investors may hesitate in erecting office buildings, hotels, apartment houses, etc., if costs of material and labor are high. There is expected to be a continued demand of large proportions for shapes for shipbuilding and car and locomotive building. The effect of peace might be to stimulate this work rather than decrease it.

We quote beams and channels up to 15 in. at 3c. at mill, Pittsburgh, for fourth quarter.

Rails.—The leading interest has orders for rails on its books which at the present rate of production, would take a year to fill. The end of hostilities would perhaps release many of the rail mills now working on shell steel, but it is expected that orders from domestic and foreign railroads would soon fill up this capacity.

Iron and Steel Bars.—The quantity of commercial steel bars now being produced is very low, demands for shell steel, which have been increasing of late, having taken up practically all available facilities.

We quote soft-steel bars rolled from billets at 2.90c.; from old steel rails, 3c.; common iron bars, 3.50c.; and refined iron bars at 5c., at mill, Pittsburgh, for fourth quarter.

Wire Rods.—Production of wire rods will be still further restricted by demands upon the wire mills for increased output of shell rounds. Production now does not exceed 50 per cent. Prices on wire rods are given on page 997.

Wire Products.—The situation in wire products is growing more serious for all commercial consumers. Jobbers are finding it almost impossible to get their orders filled. Some commercial orders are being taken care of by the utilization of discard steel, but in the aggregate this does not mean a large enough tonnage to fill more than a fraction of wants. Government pressure upon the wire companies for 82-mm. shell steel has increased, some producers having been asked to more than double their output during the next 30 days. This takes more steel and leaves less for wire and nails. The Government has allocated orders for 6000 or 7000 tons of wire nails to be shipped to the American Expeditionary Forces. In addition, there are the large barbed wire requirements of this Government and the Allies previously reported. With less steel available for drawing into wire, the output of wire products is likely to drop below the 50 or 60 per cent rate which mills have been maintaining. Prices are given on page 997.

Cotton Ties.—The season is practically over.

We quote cotton ties for October shipment at $1.96 per bundle of 45 lb., f.o.b. Pittsburgh.

Sheets.—Production of sheets last week dropped to the lowest point in the history of the industry. The shortage of sheet bars was the factor which caused this slump. None of the mills is operating over 60 per cent, and some are very much below that rate. But notwithstanding decreased production, the Government placed large additional orders for sheets; in fact, last week was noted both for record low production and for very large Government orders. These orders indicated that Washington is not being affected by peace talk, but is anticipating requirements as if the war were to continue for six months or a year longer. Many of the mills are not able to take care of jobbers' orders, the A priorities taking all of their output. Prices on sheets are given in detail on page 997.

Tin and Terne Plate.—A decision is expected shortly from the Director of Steel Supply as to the restrictions which are to be placed upon the use of tin plate for dry food containers. The question of the extent to which oil canners are to be permitted to use cans is also to be decided at the same time. The large oil companies are said to be very much worried lest the Government will require the use of other than tin containers for oil, especially on export shipments, except to our own Army and Navy. There is a prospect that an order will be issued requiring the packing of all dry foods in paper or other containers, so that tin may be conserved. So little terne plate is now being manufactured, as compared with normal times, that it is scarcely a factor. We quote tin plate at $7.75 per base box for fourth quarter. Prices on terne plates are given in detail on page 997.

Coke.—Output of Connellsville coke has been further reduced by the blowing out of 1422 bee-hive ovens by the H. C. Frick Coke Co. According to the Connellsville *Courier*, the blowing out of ovens by this company has been in progress since the first unit of the new by-product plant of the Carnegie Steel Co. at Clairton, Pa., went into operation. Shortly after the Clairton plant began to produce coke, more than 2500 ovens were blown out at plants from which raw coal shipments were being made. During the first 10 days of this month, the Frick company blew out 1422 ovens. These idle ovens are not all at plants from which coal is being shipped, being distributed over both districts of the region, but the larger number is at Leckrone, Edenborn, Lambert and Ronco, in the lower Connellsville region, the three last-named mines having diverted their entire coal output to Clairton. The estimated production of coke for the week ended Saturday, Oct. 5, was 330,160 tons, a loss of 5035 tons. Shipments continue at a good rate, very little trouble being experienced as to transportation facilities.

We quote 48 hr. bee-hive blast furnace coke at $6; 72 hr. bee-hive foundry coke at $7 and crushed coke over ¾ in. at $7.30, all in tons of 2000 lb. at oven. We quote by-product coke at $5.70 for run of ovens and $6.70 for selected foundry in all States but Alabama and Washington. To these base prices should be added the freight rate from the competing bee-hive coke district which takes the lowest freight rate to the point where such by-product coke is produced, except that there shall be added, in addition, for coke manufactured in New England 7c. for each 5c. above 60c. in the freight charges per ton (2240 lb.) of coal for water transportation on the coal used in the manufacture of such coke.

Shafting.—Specifications are heavy, but all are for Government work.

For fourth quarter we quote cold-rolled shafting at 17 per cent off list in carloads and 12 per cent in less than carloads, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets.—Practically everything is for the Government. There are no new features. Demand is active. Prices are quoted on page 997.

We quote button-head structural rivets at $4.40, conehead boiler rivets at $4.50 per 100 lb. Small rivets are 50 and 10 per cent off list for fourth quarter, f.o.b. Pittsburgh.

Spikes.—As the Allied armies advance in France and Flanders, the demand for railroad spikes increases and producers are having difficulty meeting requirements.

Standard sizes of railroad spikes 9/16 x 4½ in. and larger, $3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes, $5.25 per 100 lb.; rack bolts, $4.90 base in lots of 200 kegs or more; less than 200 keg lots, $1 per 100 lb. extra. All f.o.b. Pittsburgh.

Boiler Tubes.—The Emergency Fleet Corporation and the locomotive builders continue to take the bulk of the output of welded and seamless boiler tubes. Discounts on boiler tubes are given on page 997.

Wrought Pipe.—Production of welded tubular goods continues at a fair rate considering the iron and steel shortage, but shipments are only on priority. Discounts on iron and steel pipe are given on page 997.

Hot and Cold-Rolled Strip Steel.—Market conditions show no change. There is a fairly active demand, particularly for hot rolled.

We quote cold-rolled strip steel at $6.50 base per 100 lb., f.o.b. Pittsburgh, for 1½-in. and wider, 0.100 in. and thicker, hard temper in coils under 0.20 carbon. Boxing charge 50c. per 100 lb.

Hoops and Bands.—Though production does not exceed 50 per cent of capacity, the output seems to take care of the demand. Hoops and bands remain on the basis of 3.50c. for fourth quarter.

Old Material.—Steel plants are constantly urging shipments of heavy melting steel and will take whatever is offered. The volume of business being done by dealers is being steadily reduced, largely through their inability to obtain supplies. Some of the dealers put in bids for the old material offered by the Pennsylvania Railroad on a contract basis, but it is believed that practically all of this material, as has been

the case for months, will go direct to consumers. We quote:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$29.00
No. 1 cast scrap (for steel plants)	29.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh	34.00
Hydraulic compressed steel scrap	29.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	29.00
Bundled sheet stamping scrap	$22.00 to 23.00
No. 1 busheling scrap	28.00 to 29.00
Railroad grate bars	28.00 to 29.00
Low phosphorus melting stock (unguaranteed)	34.00
Low phosphorus melting stock (guaranteed)	36.50
Low phosphorus melting stock (bloom and billet ends, heavy plates)	39.00
Iron car axles	46.00 to 46.50
Locomotive axles, steel	46.00 to 46.50
Steel car axles	46.00 to 46.50
Railroad malleable (for malleable works)	34.00
Machine shop turnings	19.00
Cast iron wheels	29.00
Rolled steel wheels	36.00
Sheet bar crop ends (at origin)	35.00
Cast iron borings	19.00
No. 1 railroad wrought scrap	34.00
Heavy steel axle turnings	24.00
Heavy breakable cast scrap	28.00 to 29.00

Ferroalloys.—Ferromanganese and spiegeleisen are not in great demand, consumers being pretty well covered for nearby needs. The market is weak, but we learn of no concessions in prices. There is an active demand for 50 per cent ferrosilicon for next year and business is being done at $150, delivered. For delivery over the remainder of this year, the price is $150 to $155, delivered. Ferrotungsten is active and sales have been made at $2.60 per lb. of contained tungsten.

We quote 70 per cent ferromanganese at $250, delivered, and 16 to 18 per cent spiegeleisen, $75, f.o.b. furnace, an addition or deduction of $3.50 per unit being made when the manganese content is above or below the standard. For delivery over the remainder of the year, 50 per cent ferrosilicon is quoted at $150 to $155 and for next year at $150, delivered.

We quote 9 per cent Bessemer ferrosilicon at $55; 10 per cent, $57; 11 per cent, $60.30; 12 per cent, $63.60. We quote 6 per cent silvery iron, $42; 7 per cent, $43; 8 per cent, $45.50; 9 per cent, $47.50; 10 per cent, $50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2.90 per gross ton, for delivery in the Pittsburgh district.

Cincinnati

CINCINNATI, Oct. 15—(*By Wire*).

Finished Material.—Jobbers are now adhering strictly to the fixed price of $4.23 per keg base on wire nails, which is a reduction from the former base figure made by them of $4.50. This quotation is made up on the base price of $3 50 Pittsburgh, 23c. freight rate and and 50c. allowed for handling charge. In some cases, it is thought that when customers order less than carload lots of nails, the less than carload freight rate of 33c. should be allowed, but this apparently is not supported by leading dealers. Lately a considerable tonnage of small structural shapes and steel bars has been shipped back to the Pittsburgh district, the full price of 4.13c. per lb. Cincinnati charged. This is an indication that an extreme shortage of this class of material exists in that district. Cold rolled shafting is in urgent demand and there is little improvement in the mill shipments. Inquiries for galvanized sheets are heavy, but neither the jobbers nor the mills can take care of their customer's needs. A small amount of barbed wire was received recently, but it is not sufficient to meet the demands made on the jobbers. Blue annealed sheets are also wanted, and the supply is a little more plentiful.

The following are local jobbers' prices: Steel bars and small structural shapes, 4.13c. base; large rounds and squares 2 in. and over, 4.23c. base; plates, 4.48c. base; No. 10 blue annealed sheets, 5.48c.; steel bands, 3/16 in. and lighter, 4.98c. base (using the new band list). Reinforcing concrete bars, 4.25½c., and wire nails, $4.23 per keg base.

Pig Iron.—The furnaces are insisting on more stringent observations of Government regulations from their customers, and have sent out letters advising that the monthly pledge blanks must be filled out and returned promptly or the iron will probably be allocated to some other melter. Some difference in opinion exists as to whether foundry iron will become as scarce as is generally believed. The cutting off of shipments to non-essential industries has, of course, increased the supply to some extent for consumers who are on the essential list. And the more even distribution of iron also helps out the situation to a considerable degree. The southern Ohio furnaces are probably under more strict regulations than those in the Birmingham district. However, Southern producers are selling very little iron for any shipment, and the bulk of business now transacted covers mostly off iron with an occasional small tonnage of No. 2 foundry for prompt shipment. Future contracting is at a standstill. An improvement in the quality of coke furnished Southern furnaces is a matter of general comment, and tends to reduce the production of off iron to some extent. Both basic and malleable users are depending on their urgent essential contracts in hand to enable them to get iron as fast as wanted. As a matter of fact, no effort is now being made to sell any basic. No complaints are received as to delayed shipments from any district.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote, f.o.b. Cincinnati:

Southern coke, No. 2 foundry and No. 2 soft	$37.60
Southern Ohio, No. 2	35.80
Basic, Northern	34.80

Coke.—Shipments of foundry coke from both the New River and Pocahontas fields are being sent forward on contracts made some time ago, but no new business is being taken on now for the reason that the price of both 48 and 72-hr. coke was fixed at $8 per net ton and this naturally has caused the ovens to produce only furnace coke except where necessary to make fuel for application on former contracts. Some spot Wise County foundry coke is being offered, but the sellers are careful to so distribute it among their different customers that the total tonnage will not fall into the hands of any one or two consumers. Reports from the Connellsville district indicate that the labor situation is not improving as fast as was expected, although it is much better than it was six weeks ago. Pig iron furnaces appear to be receiving all the coke they need, and in some cases limited stocks have been accumulated for future contingencies.

Old Material.—The urgent call for nearly all kinds of scrap is unchanged. Dealers state that the supply for the future is fast becoming a serious proposition. Sources from which scrap was drawn in the past are now furnishing a curtailed tonnage, while the demand from the melters is at a high water mark. Shipments to both the Pittsburgh and Cleveland districts continue quite heavy, and the foundries in this vicinity are consuming a larger percentage of scrap than at any time in the history of the business. The following are buying market prices, f.o.b. cars Cincinnati and southern Ohio, in carload lots:

Per Gross Ton	
Bundled sheet scrap	$21.50 to $22.50
Old iron rails	33.50 to 34.00
Relaying rails, 50 lb. and up	44.50 to 45.00
Rerolling steel rails	31.00 to 32.00
Heavy melting steel scrap	27.50 to 28.00
Steel rails for melting	27.50 to 28.00
Old carwheels	27.50 to 28.00
Per Net Ton	
No. 1 railroad wrought	$29.00 to $29.50
Cast borings	13.00 to 13.50
Steel turnings	14.50 to 15.00
Railroad cast	25.00 to 25.50
No. 1 machinery	28.00 to 28.50
Burnt scrap	17.50 to 18.00
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	35.50 to 36.00
Pipes and flues	21.00 to 21.50
Malleable cast	24.50 to 25.00
Railroad tank and sheet	19.00 to 19.50

The Skinner Brothers Mfg. Co., St. Louis, maker of blow pipes, and at present working on extensive war contracts, has acquired a square block of property on the Missouri-Pacific tracks at South Vandeventer and Boyle Avenues, to which it will move from its present location at Tenth and Tylor Streets.

Chicago

CHICAGO, Oct. 14 (*By Wire*).

Though the general belief is that the war is far from being ended, the talk of peace has injected a conservative element into the attitude of many customers. This is exemplified by the disinclination of some users of pig iron to take offerings of pig iron which a few days ago they would have bought with avidity, while in the old material market scrap has appeared from mysterious sources with the result that the market shows a weaker tone. The steel mills, loaded as they are with all kinds of Government work, reflect none of the conjecture over the duration of the war. Specifications and orders of the kind which can be filled have been heavy this month. One large independent mill is now declining to take priority orders with a B rating inasmuch as it is useless to put on its books orders it cannot fill. Government orders which must come first absorb its open-hearth capacity, and beyond this it cannot go. It is understood here that 135,000 tons of rails which are to go to France will be rolled entirely in the East. As reported in THE IRON AGE last week, 40,000 cars additional for France are now under consideration. Agents of Southern producers are hoping their principals will soon be willing to take business for the first half. One such agent is encouraged by the acceptance by his furnace of a few small orders for delivery this year.

Pig Iron.—The most significant happening in the local iron market is the action of a Southern furnace in accepting a few small orders for delivery this year, whereas it has been refusing to accept business of any kind heretofore. It is hoped that the furnace in question and others in the South will soon open their books for next year. The Northern furnaces continue to take orders for first half delivery although this business has slowed up to a considerable extent. In every case where an order is accepted, it must be thoroughly understood, the usual pledges have to be given as to the essential character of the requirement. Of interest is the fact, attributed to sentiment created by peace talk, that some melters were indifferent to-day when offered off-sulphur iron. Last week they were eager to take iron of this character despite the high price it commands. Now they seem to think the end of the war is in sight and that they will do well to avoid committing themselves to an inferior product at high prices. There are plenty of inquiries for standard grades, but no iron wherewith to satisfy the demand. Lake Superior charcoal Scotch, C to AA, ranges from $38.50 to $40 furnace and for Chicago delivery is subject to a freight rate of $2.20 or $2.50. Lake Superior charcoal No. 6 is $39 furnace and subject to freight rates of $2.20 or $2.50.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$38.70 to $39.00
Northern coke foundry, No. 1, silicon, 2.25 to 2.75	35.25
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	34.00
Northern high-phosphorus foundry	34.00
Southern coke, No. 1 foundry and No. 1 soft, silicon, 2.75 to 3.25	42.00
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	40.25
Southern foundry, silicon, 1.75 to 2.25	39.00
Malleable, not over 2.25 silicon	34.50
Basic	33.00
Low phosphorus (copper free)	54.00
Silvery, 7 per cent	50.00

Ferroalloys.—Inquiry is not large for either ferromanganese or spiegeleisen. Ferromanganese offered for the first quarter does not seem to be wanted and there is a suspicion that consumers feel they may be able to purchase at a lower figure if they wait, this being engendered by talk of the war ending soon. The largest interest in ferrosilicon is not yet taking general business for next year.

We quote 70 per cent ferromanganese at $250, delivered; 50 per cent ferrosilicon at $150 to $160, delivered, and 16 to 18 per cent spiegeleisen at $75, furnace.

Plates.—Not much is to be said except that Government allocations continue, if not so heavy as they have been. Many light plates are wanted for cantonment work, especially for tanks. About all that jobbers can get is off sizes and material rolled from off heats.

The official mill quotation is 3.25c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers who have stock quote 4.52c.

Structural Material.—Here also Government allocations take all that can be spared from ship and railroad work. The Milwaukee Bridge Co. will supply 675 tons needed for deck and girder spans by the United States Railroad Administration for the Great Northern Railroad.

The official mill quotation is 3c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 4.27c. for material out of warehouse.

Bars.—All the mild steel bars produced are going into direct or indirect Government work. The demands of motor truck manufacturers are heavy, with an A-5 rating which is expected to be bettered. Bar iron specifications are good, makers now having acquired a backlog. Rail carbon bar production continues to be restricted by the lack of re-rolling rails.

Mill prices are: Mild steel bars, 2.90c. Pittsburgh, taking a freight rate of 27c. per 100 lb.; discard bars, 3.25c., Chicago; common bar iron, 3.50c., Chicago; refined iron bars, 5c.; rail carbon, 3c., Chicago.

Jobbers quote soft steel bars, 4.17c., bar iron 4.17c., for ¼ in. thick and heavier. Reinforcing bars, 4.29½c. base. Under the new price there is no charge for twisting, but extras for sizes are quoted as per card. Shafting, list plus 13 per cent.

Sheets.—Though sheets are the most easily obtainable of any finished products, they are nevertheless in good demand for Government work arising from both army and navy needs. Production keeps its level as established in recent months. For prices see finished iron and steel f.o.b. Pittsburgh, page 997.

Chicago delivery out of stock regardless of quantity, No. 10 blue annealed, 5.52c.; No. 28 black, 6.52c., and No. 28 galvanized, 7.77c.

Rails and Track Supplies.—It is understood that the 135,000 tons of rails which France requires will be rolled in the East. The mills here are taking no new orders, but are shipping heavily.

Standard railroad spikes, 3.90c., Pittsburgh. Track bolts, with square nuts, 4.90c., Pittsburgh. Tie plates, steel, 3.25c.; tie plates, iron, 3.75c.; f.o.b. maker's mills. The base for light rails is 3c., f.o.b. maker's mill, for 25 to 45-lb. sections, lighter sections taking Government extras.

Wire Products.—With no one fully satisfied, the situation drags along unchanged. Because of the new base established for small weight spools of barbed wire, a new card of prices will be issued for 80-rod wire, which is generally used for domestic purposes. For prices see finished iron and steel f.o.b. Pittsburgh, page 997.

Cast-Iron Pipe.—The pipe required by the Ohio nitrate plants has been placed. The United States Cast Iron Pipe & Foundry Co. will supply 900 tons for the plant at Ancor, Ohio, and 500 tons for the Toledo plant. The Akron, Ohio, inquiry calling for 5050 tons will come up Oct. 18.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $69.80; 6-in. and larger, $66.80. Class A and gas pipe, $1 extra.

Bolts and Nuts.—As anxiously as any industry, the bolt and nut makers are watching for any change in the war program. Meanwhile they are as busy as they can be and taking on only such business as can be accompanied with the necessary pledges to secure raw material. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 997. Jobbers quote:

Structural rivets, 5.67c.; boiler rivets, 5.77c.; machine bolts up to ⅞ x 4 in., 37½ per cent off; larger sizes 25 and 5 off; carriage bolts up to ⅞ x 6 in., 32½ off; larger sizes, 20 off; box pressed nuts, square, tapped, 78c. off; hexagon tapped, 58c. off; coach or lag screws, gimlet points, square heads, 40 per cent off. Quantity extras for nuts are canceled.

Old Material.—Despite the fact that the market has been more active this last week, it shows a weaker tendency, which may be attributed to the fact that considerable material has unexpectedly appeared. Though the market is softer, there has been no break in prices. In ordinary times, declines would be shown this week, and they will come if the present tendency continues. Lists have been issued by the Great Northern and the

Chicago & Western Indiana railroads. There are no price changes to report.

We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Old iron rails	$39.00
Relaying rails	$55.00 to 60.00
Old carwheels	29.00
Old steel rails, rerolling	34.00
Old steel rails, less than 5 ft	34.00
Heavy melting steel	29.00
Frogs, switches and guards, cut apart	29.00
Shoveling steel	29.00
Heavy steel axle turnings	24.00
Per Net Ton	
Iron angles and splice bars	$34.82
Iron arch bars and transoms	41.52
Steel angle bars	30.36
Iron car axles	41.52
Steel car axles	41.52
No. 1 railroad wrought	30.36
No. 2 railroad wrought	29.46
Cut forge	29.46
Pipes and flues	25.89
No. 1 busheling	27.68
No. 2 busheling	20.00
Steel knuckles and couplers	30.36
Coil springs	30.36
No. 1 cast scrap	30.36
Boiler punchings	32.59
Locomotive tires, smooth	40.50 to 41.50
Machine-shop turnings	16.50 to 16.96
Cast borings	16.50 to 16.96
Stove plate and light cast scrap	25.50 to 25.89
Grate bars	25.50 to 25.89
Brake shoes	25.50
Railroad malleable	30.36
Agricultural malleable	29.00 to 30.00
Country mixed scrap	22.50 to 23.00

Philadelphia

PHILADELPHIA, Oct. 15.

Owing to the present condition in the iron market, in which a very large percentage of the business is directly or indirectly controlled by the Government, negotiations for peace could not have the important effect that would come if business were not so controlled; but there has been a feeling of hesitancy during the past few days, just enough to give an intimation of what would happen in the event of negotiations for peace being seriously undertaken. The feeling was shown, for example, in the cold reception which was tendered the plan of the Pennsylvania Railroad proposing to sell its scrap on contracts extending over a six-months' period. Some dealers refused to bid, on the ground that they did not desire to obligate themselves so far in the future, as they feared that in the event of a cessation of hostilities in Europe there would be a slump, and they would find themselves embarrassed by large tonnages of scrap under contract.

The effects of influenza, followed in many cases by pneumonia, have been very seriously felt in Philadelphia and vicinity during the past week. The increase in the number of cases is not, however, now so rapid as it was a few days ago in Philadelphia, and the feeling is general that in this city better conditions will soon prevail, but the disease is extending in other directions and at Coatesville, particularly, all the iron and steel plants are affected. The Alan Wood Iron & Steel Co. has been compelled to bank one blast furnace, its open-hearth output has been reduced about 50 per cent, and its finishing capacity has also been affected. Similar conditions prevail in many other plants in eastern Pennsylvania.

Considerable difficulty is still being experienced in getting jobbers to conform to requirements of the Priority Board in regard to affidavits. This is not due to unwillingness to comply, but solely to a misunderstanding as to what is really demanded.

Iron Ore.—The sale of 50,000 tons of Spanish spathic low phosphorous iron ore has been made to the Midvale Steel & Ordnance Co. and one of 30,000 tons to the Eastern Steel Co. The ore analyzes: iron, 56 per cent; manganese, 4 per cent; phosphorous, 0.006 per cent. The price was about 32c. a unit, delivered, Philadelphia. In past years some difficulty was experienced in selling this ore, because it was high in manganese, but the manganese content has made it especially desirable in the manufacture of munitions. Before the war, this ore sold as low as 7¾c. per unit. The sale of the 80,000 tons followed prolonged correspondence with Washington in regard to obtaining vessel tonnage to bring the ore from Spain, and the necessary vessels will be provided through the American Government.

Pig Iron.—The pig-iron business in the Eastern territory is so thoroughly in the hands of the Government that salesmen have little to do except look after details. As an illustration of the extent to which the Government control extends, a rather amusing incident occurred recently when a buyer appealed to Washington to obtain a single carload of pig iron, and was gravely informed that he might take up that purchase with a seller in the Philadelphia district. While there is no great abundance of pig iron, the men who have been longest in the business see no cause for anxiety. We quote standard grades of iron for delivery in Philadelphia, except low phosphorous grades for which f. o. b. furnace prices are quoted:

Eastern Pennsylvania No. 1 X	$40.60
Eastern Pennsylvania No. 2 X	38.85
Eastern Pennsylvania No. 2 foundry	37.60
Virginia No. 2 X	41.75
Virginia No. 2 foundry	40.50
Basic	36.60
Gray forge	36.60
Bessemer	38.80
Standard low phosphorus (f.o.b. furnace)	54.00
Low phosphorus (copper bearing, f.o.b. furnace)	51.00

Old Material.—Shortage of some kinds of scrap has been so serious in the past few days that it has been necessary to take some old material from various plants and send it to others which were more urgently in need of it. The bidding on the large tonnage of scrap for the Pennsylvania Railroad was not active, partly on account of the unwillingness of dealers to obligate themselves to take the material so far in advance, and also because it is understood that the plan is not meeting with favor among some Government officials. The American Iron and Steel Institute Sub-committee on Scrap Iron and Steel is taking a very decided stand against permitting dealers to violate the prices and regulations promulgated by the sub-committee in conjunction with Government officials. Warning is being given in most positive language that no mercy will be shown to future offenders and that more severe punishment than has heretofore prevailed will be inflicted. The reports that permits have been issued to allow some consumers to pay $1.50 a ton more for certain tonnages of cast scrap are positively denied. W. Vernon Phillips, chairman of the sub-committee, states that the permits to allow certain mills to pay $21 for borings and turnings expired on Sept. 28 and that no more permits of this kind for any material will be issued, unless imperatively demanded in order to keep plants engaged on Government work in full operation. We quote for delivery in Philadelphia and nearby points as follows:

No. 1 heavy melting steel	$29.00
Steel rails, rerolling	34.00
No. 1 low phosphorus, heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus, 0.06 and under	$32.00 to 34.00
Old iron rails	29.00
Old carwheels	29.00
No. 1 railroad wrought	34.00
No. 1 yard wrought	33.00
Country yard wrought	29.00
No. 1 forge fire	29.00
Bundled skeleton	29.00
No. 1 busheling	31.00
No. 2 busheling	19.00 to 20.00
Turnings (or blast furnace use)	19.00
Machine-shop turnings (for rolling mill use)	19.00
Cast borings (for blast furnace use)	19.00
Cast borings (clean)	19.00
No. 1 cast (for steel plant use)	29.00
No. 1 cast (cupola sizes)	34.00
Grate bars	28.00 to 29.00
Stove plate	28.00 to 29.00
Railroad malleable (for steel plants)	29.00
Railroad malleable (for malleable works)	34.00
Wrought iron and soft steel pipes and tubes (new specifications)	33.00
Ungraded pipe	29.00

Ferroalloys.—The market for ferromanganese and spiegeleisen is undoubtedly easier, and reports continue that spiegeleisen has been sold at $75, delivered. We quote 70 per cent ferromanganese at $250, delivered, and 16 to 18 per cent spiegeleisen at $75, f. o. b. fur-

nace, $3.50 being the unit price on both alloys for variations from these standards.

Coke.—There is considerable shifting of coke from one blast furnace to another, under direction of the Washington officials, and in some cases this policy does not seem to bring about the desired relief. Many furnaces are working from hand to mouth, in imminent danger of being compelled to bank. Foundries are comfortably supplied for near-by requirements, but the general opinion is that few are provided for needs extending beyond a month or two. The storing of coke has been understood to be contrary to the wishes of the Fuel Administration. We quote 48-hr. blast-furnace coke at $6, and 72-hr. foundry coke at $7, f. o. b. Connellsville.

Finished Iron and Steel.—The movement of plates to Hog Island and other shipbuilding plants continues very heavy. One company shipped 18,000 tons in September and 12 000 tons in August. It is expected that the Hog Island plant will require 75,000 tons per month when it gets in full operation. Director General Schwab is in Philadelphia to-day conferring with the plate manufacturers in regard to delivery of material. A feature of the finished-material market is the tremendous demand for bolts and nuts for the shipbuilding plants, and manufacturers are having much difficulty in meeting it. We quote plates at 3.48c.; plain structural material, 3.23c.; soft steel bars, 3.13c.; common bar iron, 3.73c.; refined iron bars, 5.23c.; No. 10 blue annealed sheets, 4.48c.; No. 28 black sheets, 5.23c.; and No. 28 galvanized sheets, 6.48c., all Philadelphia.

Birmingham

BIRMINGHAM, ALA., Oct. 14.

It is very evident that a lot of iron ordered for the last quarter will not be delivered on time and that much of it will lap over into 1919. The largest foundry iron maker, which has been known to carry as much as 145,000 tons in yards, does not expect to have any stocks at all at the end of this month. It is needless to say that smaller foundry producers will be in the same fix. One interest is shipping at the rate of 22,000 tons this month with a production of 16,000. One other concern has only a few hundred tons in yards. Practically the only available iron after Nov. 1 will be the current production. With a dozen stacks on basic and several of the 18 active foundry stacks on the lame-duck list, foundry iron is becoming scarcer. One concern is reported to have sold 75,000 tons into 1919. If that is the case, the sales are largely in the nature of options. Allocations come regularly, the major portion being for shipbuilding plants. Alabama furnaces have been asked to take on more basic, but they are fighting shy of it and will avoid it if possible. Of that, however, there does not seem much chance. Some of the basic manufactured has failed in specifications and has been diverted to other consumers than the ones originally designated. Production shows little sign of increasing. The nine months production has been only 1,900,000 tons and under present pace of production the totals for the year in Alabama will be only 2,550,000 tons, a decrease from the high record of 1917 of around 400,000 tons. With this deficiency in production and no stocks the tale is told. The Republic company expects to start a third furnace at any time dependent upon finishing details on its new washer, on which there is still some delay. Shipments are unimpeded, iron moving as offered. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

No. 2 foundry and soft	$34.00
Basic	33.00

Cast Iron Pipe.—Jobbers appeal in vain for sanitary pipe, of which the general trade is well-exhausted. The line has been drawn tight and no relief is in sight. Water pipe concerns report about as much business as the labor that could be secured can handle. The leading interest is operating at Birmingham, Anniston and Chattanooga on pipe for essentials and the Bessemer plants machine shop is turning out castings.

Coal and Coke.—The coal production for the past week reached 409,000 tons, an increase over both the two preceding weeks of 25,000 tons. Predictions have so frequently proved erroneous that no one forecasts whether this pace will be maintained, although indications point that way. The year's maximum was in the week ending July 27 with 433,000 tons. Some coke is moving to Texas and the Pacific coast, but ovens are principally engaged on coke for furnaces in the district. Foundries seldom have more than a few days supply on hand.

Old Material.—The scrap market is moving in smooth channels, the trade being confined to the district for heavy melting and No. 1 cast, with wrought and stove plate, etc., going as far as Chattanooga and Knoxville, but seldom further. We quote per gross ton, Birmingham district delivered price, as follows:

Old steel axles	$37.00 to $40.00
Old steel rails	28.00 to 30.00
Heavy melting steel	27.00 to 27.50
No. 1 railroad wrought	30.00 to 33.00
No. 1 cast	30.00 to 31.00
Old carwheels	30.00 to 31.00
Tramcar wheels	28.00 to 29.00
Machine shop turnings	17.00 to 18.00
Cast-iron borings	17.00 to 18.00
Stove plate	25.00 to 26.00

St. Louis

ST. LOUIS, MO., Oct. 14.

Pig Iron.—Although almost every consumer in the St. Louis district would take pig iron in large and small lots if it were available, there has been nothing large in the way of bookings during the past week. Small lots continue to be sold, mostly surplus runs of off analysis, some high silicon, etc., but the bulk of the new business now is under Government priority control and therefore independent transactions are few. In general, this year's business has all been taken care of. The stove foundries are fairly active, but their allotments are only 50 per cent of their requirements in former years. At that they are in fairly good condition as to stocks, having made it a practice in past years to supply themselves ahead instead of from hand to mouth as in the case of small foundrymen. More and more foundries are getting into the classification which assists them in getting pig ron, and that is helping the situation. Labor, however, is short.

Coke.—Coke is only obtainable on existing contracts, which the ovens are living up to in very good shape, and very little of deferment of shipment is reported from any cause. There are good stocks at most foundries and practically all consumers are protected for the current year.

Finished Iron and Steel.—Finished products are in about the same condition as previously reported, with the mills making no contracts and few deliveries except for war work. Warehouse men are behind in deliveries and are pressed for material, which continues to be severely censored as to use before delivery. For stock out of warehouse we quote as follows: Soft steel bars, 4.24c.; iron bars, 4.50c.; structural material, 4.34c.; tank plates, 4.59c.; No. 8 sheets, 5.54c.; No. 10 blue annealed sheets, 5.59c.; No. 28 black sheets, cold rolled, one pass, 6.59c.; No. 28 galvanized sheets, black sheet gage, 7.84c.

Old Material.—Considerable trading was done among the dealers in scrap during the past week on the lines of the trading reported previously, the peace talk and other conditions tending to lead the smaller dealers to get Government prices while possible. The larger dealers have bought heavily to hold against the future and also to deliver on contracts. Railroads are not selling their scrap. Lists out during the week were few and most of these were held up after bids were in. This was true of lists from the Big Four, the Wabash and other lines. There is some report of shipment direct from the Government controlled roads to industries and dealers, if the report be true, are wondering what they will have in the way of business if it keeps up. The

Wabash offered about 1100 tons, the Big Four about 2000, the Missouri, Kansas & Texas about 200 tons, and some smaller lots were put up for private sale. Consumers would buy freely all offerings almost regardless of price, but conditions are such that they are getting very little opportunity to, as the aggregate in sight is small. We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

	Per Gross Ton
Old iron rails	$38.50 to $39.00
Old steel rails, rerolling	33.50 to 34.00
Old steel rails, less than 3 ft	31.00 to 31.50
Relaying rails, standard sections, subject to inspection	55.00 to 65.00
Old carwheels	28.50 to 29.00
No. 1 railroad heavy melting steel scrap	28.50 to 29.00
Heavy shoveling steel	28.00 to 28.50
Ordinary shoveling steel	27.00 to 27.50
Frogs, switches and guards, cut apart	28 50 to 29.00
Ordinary bundled sheet scrap	24.75 to 25.25
Heavy axle and tire turnings	21.50 to 22.00
	Per Net Ton
Iron angle bars	$33 00 to $33.50
Steel angle bars	29.50 to 30.00
Iron car axles	41.00 to 41.50
Steel car axles	41.00 to 41.50
Wrought arch bars and transoms	40.00 to 40.50
No. 1 railroad wrought	29.75 to 30.25
No. 2 railroad wrought	29.00 to 29 50
Railroad springs	29.75 to 30.25
Steel couplers and knuckles	29.75 to 30.25
Locomotive tires, 42 in. and over, smooth inside	38.50 to 39.00
No. 1 dealers' forge	26.00 to 26.50
Cast iron borings	16.50 to 17 00
No. 1 busheling	27.00 to 27.50
No. 1 boilers cut to sheets and rings	24.00 to 24.50
No. 1 cast scrap	29.50 to 30.25
Stove plate and light cast scrap	23.00 to 23.50
Railroad malleable	28.75 to 29.25
Agricultural malleable	26.75 to 27.50
Pipes and flues	25.25 to 25.75
Heavy railroad sheet and tank scrap	24.00 to 24.50
Railroad grate bars	21.50 to 22.00
Machine shop trimmings	16.50 to 17.00
Country mixed scrap	21.50 to 22.00
Uncut railroad mixed scrap	24.00 to 24.50
Horseshoes	29.00 to 29.50

San Francisco

SAN FRANCISCO, Oct. 8.

The local iron and steel market reflects the markets in the Eastern centers, and a growing shortage of all materials is noted. All work except Government enterprises, has come to an end, but even in such work as shipbuilding for the Emergency Fleet delay in the delivery of steel and iron materials is becoming more marked. The jobbers are finding their stocks dwindling. They are receiving some replacements but not in amounts sufficient to make good the stocks sold, and gradually the situation for all materials is assuming the acute phase of sheets. However, the situation is generally understood.

Bars.—Bars continue easier than any other material. Essential needs are being supplied, but the dependence of bars on scrap in this section makes their users uneasy for the future, as the supplies of scrap are showing no evidence of increase.

Structural Steel.—No new demand for structural steel appeared in the past two weeks, and nothing of importance in the way of new developments, is reported to be in sight.

Plates.—Shipments on replacement orders showed a decided falling off in the past two weeks and the jobbers' stocks are showing the effects. These stocks, however, are still in fair condition.

Sheets.—The market is stripped practically bare. A considerable inquiry is constantly coming to the jobbers, especially for galvanized sheets, but there seems to be no prospect that these orders can be filled in the near future.

Wrought Pipe.—There has not been a great deal of inquiry recently. Prospective users understand the situation and they are either getting along without additional pipe or are searching through their scrap piles for pipe which can be made to do. A thorough search has also been made for second hand pipe, which in the present emergency can be made useful. These are the explanations which are given for the falling off in inquiry, as it is well known some really essential industries are in need of wrought pipe.

Cast-Iron Pipe.—On Oct. 1 the price of cast iron pipe was advanced $5 a ton, f.o.b. factory. This gives the basic price of $60 for 6-in. or larger and $63 for 4-in. Freight and war tax added make these rates $83.20 in San Francisco for 6-in. and larger, and $86.20 for 4-in. The Government recently placed orders through contractors for approximately 300 tons of pipe for the installation of the fresh water system on Goat Island, where sailors for the Navy are being trained. In addition it placed orders for about 130 tons of submarine pipe to convey the water to the island.

Pig Iron.—There is no change. If anything, pig iron is getting scarcer as the contracts made some time ago elapse. It is reported that no new contracts have been made for some time.

Coke.—The Northern coke is likely to be used more and more in this market although its high percentage in ash makes it an expensive proposition. Some shipments arriving here are said to have gone as high as 18 per cent in ash, although it is acknowledged that the average is much lower. One of the main objections to using this coke comes from the workers themselves, who dislike trying anything to which they are not accustomed. At the foundries where Northern coke is being tried it is said that the workmen blame every thing which goes wrong about the foundry on the coke. While this is absurd it interferes materially with output.

Old Materials.—If anything, scrap is becoming scarcer. The dealers declare that they cannot find any new supplies and they also assert that some holders of small amounts, which would total a considerable quantity in the aggregate, are unwilling to sell at the Government figures. The trade is anxiously awaiting the return from the East of Emory E. Smith, in the hope that he may have found some solution for their problems. The largest users of scrap have been accumulating stocks for a long time and it is doubtful if they would be in serious need for a number of months if the supply of scrap ceased altogether. But they have been helping out the smaller fellows, most of whom are dependent on the generosity of the more important and larger industries. In a crisis this source would be cut off and many smaller foundries and others would have to close. We quote prices of scrap on gross ton basis:

Scrap steel for cupola use	$34.00
First grade iron (machinery, railroad, agricultural)	34.00
Second grade (brake shoes)	30.00
Third grade (clean broken stove plates)	28.00
Fourth grade (grate bars, acid scrap free from burned iron)	20.00

Buffalo

BUFFALO, Oct. 14.

Pig Iron.—More and more Government work is taking up full capacity of furnaces. Increasing quotas of pig iron of all grades are coming in for allocation and everything booked continues to be by that method; that is, all iron placed is for Government purposes. Local furnaces are arranging to produce as much malleable tonnage as they will be able to during the next few months in order to care for Government requirements, allocations for which, it is understood, will be in considerable volume between now and spring. Prices are as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$37.00
No. 2 X, 2.25 to 2.75 silicon	35.25
No. 3 foundry, 1.75 to 2.25 silicon	34.00
Gray forge	33.00
Malleable, silicon not over 2.25	34.50
Basic	33.00
Bessemer	35.20
Lake Superior charcoal, regular grades, f.o.b. Buffalo	38.50

Finished Iron and Steel.—The various distributors are promptly filing their claims with their regular sources of supply for replacement of material shipped out for essential purposes during the preceding month, in line with the War Industries Board provisions for

the replenishment of stocks. It is understood that specifications are scanned closely by the mills and in many instances a modification is requested as to sizes and qualities. In some instances, the mills frankly state that they will be unable to make shipments so long as the demand for direct war uses continues as large as it is. Class A is getting practically everything that is shipped, and there is a tightening up on priorities. There seems to be very little material left for classes B and C. Some mills state that priority ratings have to be higher than A-5 to receive attention. It is understood that allocations continue to be very heavy for shell rounds and for plates and structural material to be used by the Emergency Fleet Corporation. Production of barbed wire, and most other wire, and wire nails is almost fully taken up by direct war orders, through allocations which keep coming in. Government orders for billets and ingots received recently by one local mill take up its capacity for the next four or five months. The demand for turnbuckles is good, and manufacturers hope for some advance in price to compensate for increased operating costs. The Lackawanna Bridge Co., Buffalo, has the contract for an 80 x 100 ft. foundry extension for the Strong Steel Foundry Co., taking 100 tons of steel; for seven manufacturing buildings for the Republic Carbon Co., Niagara Falls, taking 700 tons, and also the contract for a warehouse for the Atlas Crucible Steel Co., Dunkirk, N. Y., 100 tons. The George A. Fuller Construction Co., Cleveland, has been awarded the contract for two large additional manufacturing buildings for the National Aniline & Chemical Co., Buffalo, to cost $300,000 and taking 800 tons of steel. Bids are being taken by the same company for an additional building requiring about one-half this tonnage.

Old Material.—Scarcity is the prominent feature in most lines of scrap materials. All consumers would willingly take on larger tonnages, if desired materials were obtainable. Many mills have succeeded in making pretty good start in laying in tonnages required for use during the early winter months; but others have not been so successful and dealers say the outlook for the winter is not promising. Prices are firmly held, and some of the cheaper grades have gained a relatively higher level, as mentioned in last week's report. We quote the present schedule as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	$29.00
No. 1 low phosphorus, heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus, not guaranteed	34.00
No. 1 railroad wrought	34.00
No. 1 railroad and machinery cast	34.00
Iron axles	$44.00 to 46.00
Steel axles	44.00 to 46.00
Carwheels	29.00
Railroad malleable	34.00
Machine shop turnings	18.00 to 18.50
Heavy axle turnings	24.00
Clean cast borings	18.00 to 19.00
Iron rails	36.00 to 37.00
Locomotive grate bars	27.50 to 28.00
Stove plate	28.50 to 29.00
Wrought pipe	27.00 to 28.00
No. 1 busheling scrap	29.00 to 30.00
Bundled sheet stamping scrap	25.00 to 26.00

New York

NEW YORK, Oct. 16.

Pig Iron.—In regard to the question whether the rail and water competitive freight rate or the all-rail rate is to prevail in figuring on sales of Virginia iron, H. G. Dalton, chairman of the Pig Iron, Iron Ore and Lake Transportation Committee of the American Iron and Steel Institute, in a letter to a seller of Virginia iron, has ruled as follows: "The Director of Steel Supply has referred to me for answer your letter of the 1st inst. in reference to the matter of what freights, whether rail or water, shall govern in determining the delivered price for pig iron in such districts as the double basing plan is effective. In reply thereto would say that the official *all rail* freight rate in effect from Birmingham to points of destination on any sales of Virginia iron that may make or on any allocations of Virginia iron that may be made on you, shall govern." This ruling is of considerable importance to many furnaces as it makes a difference of fully a dollar per ton in shipments to a large number of points. The scarcity of foundry pig iron is more pronounced. The demand from foundries has been insistent and they have been buying off-Bessemer without question for foundry use. The Northern Ore Co. has been compelled to blow out its Keystone furnace at Island Park, Easton, Pa., on account of the stoves having proved inadequate. This stack has been making off-Bessemer because the stoves were not working satisfactorily. We quote prices as follows for tidewater delivery for Northern and Southern grades up to Jan. 1, 1919:

No. 1 X, silicon, 2.75 to 3.25	$40.90
No. 2 R, silicon, 2.25 to 2.75	39.15
No. 2 plain, silicon, 1.75 to 2.25	37.90
No. 2 X Virginia, silicon, 2.25 to 2.75	42.95
No. 1 Southern (all rail)	43.20
No. 2 Southern (all rail)	41.70

Ferroalloys.—The demand for ferromanganese and spiegeleisen is very light, only small lots having been called for in the past week. Quotations are unchanged, that for 70 per cent ferromanganese being $250, delivered, with $3.50 per unit added or subtracted above or below the 70 per cent standard. The reports continue that this could be shaded on a favorable inquiry but there is no indication that it has been. For spiegeleisen the quotation appears to be firm at $75, furnace, for 16 per cent alloy and at $82, furnace, for 18 per cent material. The manganese ore market is easing. Sales have been made in the past week of several thousand tons of Brazilian ore, some of it at $1.20 per unit, seaboard. This contrasts with as high as $1.35 and $1.40 per unit some time ago. A number of new sellers are in the market offering this and other ore. The 50 per cent ferrosilicon market is quiet and easy at $150 to $160 per ton on contract, depending on the amount desired. There is an inquiry in the market for 900 tons for delivery in 1919.

Finished Iron and Steel.—The notable development is the increased price granted bar iron mills, effective Oct. 17, as noted in detail elsewhere in this issue. The result is expected to develop some additional buying, although purchasers will in many cases hesitate to pay the 43 per cent advance which this means, the new price on refined iron being 5c. per lb. base, against 3.50c. Bar iron mills generally have three to four months' work booked but have refused for months to take anything but the most attractive offerings. All have claimed that 3.50c. represented for many sizes a considerable loss and on the smaller sizes there has been some irregularity, a demand of 4c. base being not uncommon. It is noteworthy that these smaller sections, ½ in. and smaller in rounds and squares, for example, and sections larger than, say, 1⅞ in., automatically carry the 5c. base whether refined iron or not. The point is that a certain amount of muck bar is essential in either of the extreme ranges, and the higher price is thus permitted. It is possible that a further substitution of the iron will be made for steel, in view of the growing scarcity of shell discard steel. For months a considerable tonnage of such has been sold at prices averaging about 3.65c. through the purchasers' buying the billets and paying $25 per ton for conversion. Thus $47.50 for the billets plus $25 for the conversion makes a total of about $73 for the finished steel bar. Such substitution will, of course, mean that instead of the consumer paying $15 above the steel bar base, he will have to pay $42 above the base or $27 per ton additional, assuming that the sizes come either outside the range of the 3.50c. price or that common merchant iron will not suffice. The higher freight rates which will go into effect on Nov. 1 and which will represent advances of about 6½ per cent for Philadelphia, 10 per cent for New York and 11 per cent for Boston, follow, as stated in this column, as the direct result of an abandoning of the special commodity rate for the higher general classification rate. The rates are detailed elsewhere in this issue and it may be stated that in about 60 days new rates will be established from Buffalo to maintain the usual relation between Buffalo and Eastern shipments and Pitts-

burgh and Eastern shipments. In structural lines bids have been taken for a storehouse at Washington for the Government involving 300 tons; the remodeling of a building in the Boston Navy Yard, requiring 1800 tons, is up again for figures, and New York State is asking for prices on 300 tons for an armory at Troy. The Pennsylvania Railroad has awarded 300 tons of work; a boiler plant at Hampton Roads taking 200 tons has been closed; the New York Central has awarded 700 tons for a highway bridge at 149th Street to the Phœnix Bridge Co., and the American Cellulose Co. has given a contract for 1100 tons to the Guerber Engineering Co. We quote mill shipments as follows: Steel bars, 3.145c.; shapes, 3.245c.; plates, 3.495c., and bar iron, 3.745c., all New York. Out-of-store prices are 1c. higher.

Cast-Iron Pipe.—The difficulty which many municipalities are having in extending water mains is shown by the case of the city of Newburg, N. Y. The city needs about 2500 tons to extend its mains but has been unable to finance the purchase, and in spite of the fact that the extension of mains is made necessary by the growth of the city, due to the building of the new shipbuilding plant, permission has not yet been obtained from Washington to go ahead with the enterprise. Government prices are $67.70, New York, for 6-in. and heavier; $70.70 for 4-in.; $77.70 for 3-in., and $1 additional for class A and gas pipe.

Old Material.—There seems to be a general movement among the trunk line railroads to sell their scrap under contract, according to the plan proposed by the Pennsylvania Railroad last week, and at least one contract has been made, carefully safeguarded as to changes of conditions. Mills are expected to adopt this plan more readily than the brokers who are fearful of complications which may result if they agree to buy scrap on contracts extending from three to six months. The demand for all kinds of scrap continues strong. We quote buying prices of dealers and brokers per gross ton, New York, as follows:

Heavy melting steel	$26.12
Rerolling rails	30.80
Relaying rails	$60.00 to 70.00
Iron and steel car axles	43.40
No. 1 railroad wrought	30.90
No. 1 railroad wrought, cut to not less than 10 in. or over 24 in.	35.90
Wrought-iron track scrap	28.80
Forge fire	25.00 to 26.00
No. 1 yard wrought, long	29.90
Light iron	10.00 to 11.00
Cast borings (clean)	16.85
Machine-shop turnings	16.85
Mixed borings and turnings	16.85
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long	29.90
Stove plate	26.12
Locomotive grate bars	26.12
Malleable cast (railroad)	31.12
Old carwheels	26.12

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	$34.00
No. 1 heavy cast (columns, buildings, materials, etc.), cupola size	34.00
No. 1 heavy cast, not cupola size	29.00
No. 1 cast (radiators, cast boilers, etc.)	29.00

Cleveland

CLEVELAND, Oct. 15.

Iron Ore.—Acting on the suggestion of the operating heads of railroads in the Lake Superior mining district, a committee representing the mining companies is working out a plan to cut off ore shipments from some of the mines about Nov. 1. The purpose of this move is to relieve the railroad situation in the mining region during the early winter months. In case of small underground mines, it takes some time to accumulate enough ore for a boat cargo. When the weather becomes cold, some of the ore is likely to freeze in the cars before a cargo is accumulated and cause delay in handling. Ore to replace that from mines from which shipments are suspended will in some cases be procured from other properties. In case the ore is of a grade that the consumer must have and cannot be replaced from other mines, a plan is being considered to accumulate a stock pile at the mine and load this on cars with a steam shovel as soon as sufficient ore has been mined for a cargo.

The ore movement is being seriously interfered with by the forest fires in the vicinity of Duluth. Traffic was delayed on the ore carrying railroads and boats were compelled to wait for cargoes. Normal conditions will probably not be restored before late in the week. We quote f.o.b. Cleveland for shipment during the last quarter as follows:

Old range Bessemer, $6.65; old range non-Bessemer, $5.90; Mesaba Bessemer, $6.40; Mesaba non-Bessemer, $5.75.

Pig Iron.—An interesting feature of the allocations by the pig iron committee was the placing during the week of 12,500 tons of Bessemer ferrosilicon, 14 per cent silicon, 10,500 tons of which is for the first half of next year. Arrangements have been made for one southern Ohio district to produce this iron which will go to several consumers. Until the present time, the pig iron committee has been called on to supply very little Bessemer ferrosilicon, as consumers were securing this in a sufficient quantity from their regular sources of supply. However, it is expected that until conditions change materially, consumers will call upon the committee for allocation of Bessemer ferrosilicon. Pig iron allocations during the week fell off somewhat as compared with the previous week, amounting to 40,000 tons, making a total of 1,227,000 tons from May 1 to date. Allocations included 15,600 tons of basic iron all for this year's delivery, 2400 tons of low phosphorus, 2100 tons of which is for the first half, 8300 tons of foundry iron, 700 tons of Bessemer, 700 tons of silvery, and 115 tons of charcoal iron. Several new round lots of iron for allocation are now pending before the committee. One of the Cleveland furnaces of the McKinney Steel Co. has been operating on foundry iron during the past week to supply the urgent demands of the foundry trade in Cleveland and vicinity, whose source of supply was largely shut off a few weeks ago when one of this company's furnaces then operating on foundry iron was turned to basic iron to fill a large order for England. Some high sulphur low silicon Southern iron is being offered for sale for early shipment, but there is not much demand for this iron in the Cleveland territory. We quote delivered Cleveland as follows:

Bessemer	$36.60
Basic	33.40
Northern No. 2 foundry	34.40
Southern No. 2 foundry	39.00
Gray forge	33.40
Ohio silvery, 8 per cent silicon	49.90
Standard low phosphorus, Valley furnace	53.00

Old Material.—The peace talk has had a quieting effect on the scrap trade, and dealers generally do not care to buy or sell material in any quantity until there are further developments that will indicate more clearly what the prospects are of an early peace. There is a fair volume of trading in car lots for which there is an active demand. Shipments are good and consumers generally appear to be getting scrap as fast as needed. Heavy melting steel borings, turnings and cupola scrap are the grades in most demand. Steel makers are buying considerable scrap directly from local producers, thus eliminating the dealers' commission. We quote delivered consumers' yards in Cleveland and vicinity as follows:

Per Gross Ton

Steel rails	$28.00 to $29.00
Steel rails, under 3 ft.	34.00
Steel rails, rerolling	34.00
Iron rails	39.00
Iron car axles	46.50
Steel car axles	46.50
Heavy melting steel	29.00
Cast borings	19.00
Iron and steel turnings and drillings	19.00
Hydraulic compressed sheet scrap	28.00 to 29.00
No. 1 railroad wrought	34.00
Cast-iron carwheels, unbroken	29.00
Cast-iron carwheels, broken	34.00
Agricultural malleable	29.00 to 30.00
Railroad malleable	34.00
Steel axle turnings	34.00
Light bundled sheet scrap	24.50 to 25.00
Cast-iron scrap	29.00
Cast-iron scrap, broken to cupola size	34.00
No. 1 busheling	30.00 to 31.00

Per Net Ton

Railroad grate bars	$25.00 to $25.50
Stove plate	25.00 to 25.50

Bolts, Nuts and Rivets.—Bolt and nut specifications are heavy and considerable new inquiry is coming from the Government. Shipments of steel to the bolt manufacturers are growing worse, and some of the makers are operating at only about 60 per cent of capacity because of scarcity of raw material. As a result, deliveries are getting further behind. Rivet specifications continue very heavy, but no new business in round tonnages is reported.

Finished Iron and Steel.—Some of the implement manufacturers in this territory are declining to take advantage of $5 price reduction to the implement trade for the reason that the agreement with them specified that in consideration of lower-priced steel they were not to raise the price of implements for next year. Apparently they prefer to pay the regular price and retain the privilege of raising the prices of implements. Some of the automobile manufacturers have recently cancelled considerable steel, evidently giving up hope of being able to secure material to continue the production of cars until the remainder of the year under permits granted them by the Government. Peace prospects have not resulted in any falling off in the demand for steel for Government work, which continues heavy. The Government has placed 300 miles of portable track for France with a Cleveland manufacturer. This will require 12,000 to 15,000 tons of steel, which has been allocated. A similar order placed by France a few days ago was for 150 miles of track. A Barberton, Ohio, manufacturer has placed 3000 tons of bars and shapes and new orders for steel for shipyards include one from the Toledo Shipbuilding Co. for 1100 tons of shapes and plates and another from a Cleveland yard for 240 tons of shapes for ocean-going tugs. Jobbers report no improvement in the supply of steel. They are getting soft steel bars in a very limited quantity, but no structural material except that rolled from shell discard. The demand on the jobbing trade has fallen off considerably, this probably being to some extent due to the fact that, owing to low stocks in warehouses, consumers are depending more and more upon direct allocations.

Steel bars, 4.07c.; plates, 4.42c.; structural material, 4.17c.; No. 10 blue annealed sheets, 5.42c.; No. 29 black sheets, 6.42c.; No. 28 galvanized sheets, 7.67c.

British Steel Market

Foundry Pig Iron Scarce—Shipbuilding Industry Very Active

(*By Cable*)

LONDON, ENGLAND, Oct. 15.

Foundry iron continues to be very scarce with the fuel and labor situation dominating the entire market. Orders last month were canceled in considerable quantities. The supply of hematite iron appears to be adequate. The position in steel is unaltered but activity at shipyards is increasing. Current quotations on various products are as follows:

Tin plate, coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 33s. 6d.

Ferromanganese, $260 to $265, c.i.f. for export to America and Canada; £26 10s. for British consumption.

On other products control prices per gross ton are:

Hematite pig iron, East Coast, £6 2s. 6d.; West Coast, £6 7s. 6d.

Cleveland pig iron (export), 127s. 6d. for No. 1 and 122s. 9d. for basic. Domestic prices, 9s. 3d. below these figures.

Steel plates, ship, bridge and tank, £11 10s. to £17, according to size.

S. M. boiler plates, basis, £12 10s.

Bar iron, standard quality, basis £14 15s.; marked £17, net.

Sheet and tin plate bars, £10 7s. 6d.

Blooms and billets for rerolling (ordinary), £10 7s. 6d.; special quality, £11.

Wire rods, £21 10s. net, basis.

The Nagle Steel Co., Pottstown, Pa., announces that at the former Potts Brothers iron plant the old puddle mill has been dismantled and the puddling furnaces have been broken up and scrapped to provide eventually a site for several large heating furnaces and another plate mill. The old building, together with the addition, 40 x 60 ft., for storage and loading just completed, are adequate for the present.

Safe Design of Automatic Engine Stops

Notwithstanding the kind of valve and operating equipment comprising automatic engine stops some fail, and each failure in some measure destroys confidence as to the worth of any make or method, however reliable it may be, according to a paper presented before the Association of Iron and Steel Electrical Engineers at its annual convention in Baltimore, Sept. 11, by Walter Greenwood, safety engineer, Carnegie Steel Co., Youngstown, Ohio. The assertion, he said, has been made that accounts of comparatively few flywheel explosions find their way to the press while such accidents are occurring at the rate of about twelve a month and, further, that there are 33 per cent more flywheel explosions than boiler explosions and that they are 50 per cent more costly. Regarding the causes of these accidents, he pointed out cases where connecting pins placed in the rims of flywheels and actuated by centrifugal force had become rusty. This and accumulated matter (around them and in the spring for limiting their projection or disarrangement of the springs) had prevented their compression or extension. In other cases, causes that prevented the action of the controller, such as accumulations of nonvolatile matter, oxidation of metallic parts, pressure of packing, etc., have been the cause of failures He holds that all of these causes could have been discovered and guarded against by a systematic inspection and proper construction

The shut-off valve of an automatic stop, he advised, should be so perfect that it could not fail to close when released from its fastenings for keeping it open, yet, he contended, failures from this cause have done more to shake confidence in automatic stops than any other kind of failure. He held that none but metallic packing should be used to pack the valve stems that cylinder lubricants should be admitted on the intake side of the valves, that in the cases of turbines where there may be objections to admitting grease to steam cylinders the valve stems should be lubricated by admitting the lubricant directly on them in quantities just sufficient for the purpose and that in no case should a valve stem point in a line that drops below the horizontal

It is his belief that, if any objections raised against either the electrically or mechanically operated engine stops can be sustained, the logical solution would be to install stops that contain a combination of both principles, as done by some makers This method, he holds, would claim preference because of wider adaptability in that it could be operated by breaking a circuit from a limitless number of stations and also would respond to disarrangements of engine parts or breakdowns. He cited a case where the side bearing in a journal box of a large engine became damaged to the extent that a wreck was imminent and the engine was stopped in time to prevent it by the automatic stop. Regarding the closed and open systems of electrically operated automatic stops, he stated that he has seen installations of closed circuit systems in mills where they gave perfect satisfaction and it is his contention that, as the closed system was feasible in these cases, it should be feasible in all cases.

New Scrap Dealer at Chicago

The Liberty Iron & Steel Corporation, which has just been incorporated at Chicago, has contracted with the Symington Chicago Co., manufacturer of shells for the Government, for all of that company's output of "shell ends" and shell turnings at its new munition plant in Chicago, aggregating 400 to 500 tons of such scrap per day. The incorporators of the Liberty Company, which will deal in scrap and steel, are Harry Roblin, Julius Greentree and Harry J. Lehman, officers of the Buffalo Housewrecking & Salvage Co., Buffalo, and W. W. Rossler of Chicago. The capitalization is $100,000, all paid in. W. W. Rossler, formerly Western representative of the T. H. Symington Co., Rochester, N. Y., manufacturer of railroad specialties, will be the Chicago representative of the Liberty Iron & Steel Corporation, whose offices will be located in the McCormick Building.

IRON AND INDUSTRIAL STOCKS

Market on a Broad Trading Basis—Steel Stocks Show Varying Trends

NEW YORK, Oct. 14.

Dealing in stocks the past week showed toward the end of that period a reawakening of investment buying. On Friday transactions covered the broadest list of securities of the year. Despite the energy devoted by financial houses toward pushing the purchases of the Fourth Liberty Loan, Stock Exchange sales were 3,084,828 shares, as against 3,173,351 a year ago. Existing Liberty bonds were strong, some issues moving to new high figures. Steel company shares for the most part declined slightly, metal working industrials also, except where their output was a distinct essential peace-time product.

The range of prices in active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	25⅛- 28½	Lackaw. Steel ..	72 - 76¼
Allis-Chalm. pf..	80 - 80½	Lake Supr. Corp.	16⅜- 17
Am. Can. com...	41⅜- 45½	Midvale Steel ..	47 - 49½
Am. Can pf.....	92¼- 92½	Nat.-Acme	30½
Am. Car & Fdry. com.	80¾- 86¾	Nat. Enam. & Stm. com.	43⅝- 45¼
Am. Loco. com..	62¼- 66¼	Nat. Enam. & Stm. pf.	94
Am. Loco. pf....	99¼-100	N. Y. Air Brake.	115 -116
Am. Ship com...	136½-138	Pittsb. Steel pf.	94
Am. Steel Fdries.	80½- 85⅝	Pressed Stl. com.	66½- 68¾
Bald. Loco. com.	74⅜- 82⅜	Ry. Steel Spring com.	65 - 67⅝
Bald. Loco. pf....	102	Ry. Steel Spring pf.	101½
Beth. Steel com..	70 - 73½	Republic com ..	84½- 88¾
Beth. Steel Cl. B.	69¾- 73⅝	Republic pf. ...	100 -100¼
Chic. Pneu. Tool.	63 - 67½	Sloss com.	51 - 55
Colo. Fuel	40½- 43	Superior Steel ..	38 - 40
Cruc. Steel com.	53 - 57¼	Transue-Williams	36¾- 37½
Crucible Steel pf.	89 - 89¼	Un. Alloy Steel..	37 - 37¼
Gen. Electric ...	149¾-158	U. S. Pipe com.	14 - 15¼
Gt. No. Ore Cert.	29¼- 32½	U. S. Pipe pf....	42 - 44½
Gulf States Steel.	68¾- 71¼	U. S. Steel com..	104¾-110⅜
Int. Har. of N. J. com.	136⅛-138	U. S. Steel pf...	110¼-110¾
Int. Har. of N. J. pf.	106¾	Warwick	8¼- 8¼
Int. Har. Corp. com.	68⅛- 70	Westingh. Elec..	42⅝- 45⅜

Dividends

The Cleveland-Cliffs Iron Co., quarterly, 2½ per cent, payable Oct. 25.

The Ingersoll-Rand Co., 5 per cent, payable Oct. 31.

The Poole Engineering & Machine Co., quarterly, 1½ per cent, payable Oct. 14.

The Steel Products Co., quarterly, 3 per cent on the common, payable Oct. 20.

Lackawanna Steel Earnings

Earnings of the Lackawanna Steel Co. fell off sharply in the quarter ended Sept. 30 last, when the profits were at an annual rate of $22 a share, compared with approximately $29 in the preceding quarter and $48 a year ago.

Net earnings of the company aggregated $6,561,517 for the quarter, contrasted with $7,595,298 in the corresponding period of 1917. A special reserve of $3,750,000, the same amount as in the June quarter, was set up to cover taxes and other contingencies. Profits, after all charges, amounted to $1,932,085, compared with $4,247,146 in the corresponding period of 1917.

For the nine months of 1918 ended Sept. 30 the company showed profits after charges and war taxes of $6,991,376, equivalent to $19.91 a share, compared with profits of $12,749,219, or $36.32 a share, in the corresponding period of 1917.

Pittsburgh Steel Co.'s Earnings

The statement of earnings of the Pittsburgh Steel Co. for 12 months ending June 30 is now available. A comparison with 1917 follows:

	1918	1917	Increase
Sales	$37,930,842	$33,066,083	$4,864,759
			Decrease
Net Profits .....*$	4,556,443	$ 7,811,444	$3,255,001

*After setting aside $1,238,632 as reserve for depreciation and depletion and $2,730,122 for estimated income and war profits taxes. In 1917 the amounts so charged were $1,567,279 and $1,823,548 respectively.

New Eastern Freight Rates on Billets, Pig Iron and Finished Materials

The new freight rates effective Nov. 1 on billets, pig iron and finished iron and steel to principal Eastern cities are given below. It is proposed that Buffalo district rates be put on a parity with Pittsburgh about 60 days later.

Rates on Pig Iron

	From Pittsburgh		From Youngstown	
	Old Rate	New Rate	Old Rate	New Rate
New York	$3.90	$4.30	$4.40	$4.80
Boston	4.10	4.70	4.60	5.20
Philadelphia	3.60	3.90	4.10	4.40
Baltimore	3.50	3.70	4.00	4.20
Norfolk	4.10	4.70	4.40	4.70
Albany	3.90	4.30	3.90	3.90
Utica	3.60	4.00	3.50	4.00
Syracuse	3.30	3.60	3.30	3.60
Rochester	2.80	3.10	2.60	3.00

Rates on Semi-Finished Steel

	From Pittsburgh		From Youngstown	
	Old Rate	New Rate	Old Rate	New Rate
New York.....	$4.00	$4.50	$4.50	$5.00
Boston	4.50	5.00	5.00	5.50
Philadelphia	3.80	4.00	4.30	4.50
Baltimore	3.60	3.80	4.10	4.30
Norfolk	4.30	5.00	4.50	5.00
Albany	4.00	4.50	4.30	4.80
Utica	3.60	4.10	3.50	4.10
Syracuse	3.40	3.80	3.40	3.80
Rochester	2.90	3.40	2.80	3.10

Rates on Manufactured Iron and Steel Articles

	From Pittsburgh				From Niles, Warren and Youngstown			
	Old Rates		New Rates		Old Rates		New Rates	
	C.L.	L.C.L.	C.L.	L.C.L.	C.L.	L.C.L.	C.L.	L.C.L.
New York ...	24.5	29	27	31.5	27	31.5	30	35
Boston	27	31.5	30	35	29.5	34	34	40
Philadelphia ..	23	27.5	24.5	29	25.5	30	27.5	22.5
Baltimore	22.5	27	23	27.5	25	29.5	26.5	31.5
Norfolk	30.5	37	30.5	37	30.5	37	30.5	37
Albany	24.5	29	27	31.5	25.5	30	29	34
Utica	22.5	26.5	25	30.5	22.5	26.5	25	29
Syracuse	20.5	24.5	22.5	30.5	20.5	24.5	22.5	28
Rochester	17.5	20.5	21.5	30.5	17	20	20	28

Rate on carload lots to Newport News, Va., from Pittsburgh, effective Nov. 1, is 3c. over New York rates or 30c.; From Youngstown, Niles and Warren rates are based on Norfolk, or 30.5c.

Will Discuss Semi-Steel Shells

PITTSBURGH, Oct. 16—(*By Wire*)—A committee of manufacturers left Pittsburgh Tuesday night for Washington for a conference Wednesday with the Ordnance Department on the semi-steel shell making program. The delegation consisted of George L. Brown, Marshall Foundry Co., Pittsburgh, chairman of the committee representing foundries and machine shops of the district; William C. Rice, Pittsburgh Iron & Steel Foundries Co., Midland, Pa.; J. A. Katzenmeyer, Standard Engineering Co., Ellwood City, Pa., and Robert C. Garland, chairman of the War Resources Committee of Region No. 5.

A number of companies in the Pittsburgh district have signified their intention of taking contracts for semi-steel shells, and the committee will report to the Ordnance Department that the Pittsburgh district can manufacture 3,000,000 of the shells. The committee was accompanied to Washington by Lieut. C. A. Carpenter of the Ordnance Department, Pittsburgh district.

Permit to Import Corundum

WASHINGTON, Oct. 15.—As an exception to an earlier ruling the War Trade Board has authorized the issuance of licenses during the remainder of the calendar year, when the application is otherwise in order, for the importation from England of 450 tons of finished grains of corundum. Allocation will be made by the Bureau of Imports.

Contracts for preliminary work have been signed with a construction company by William Pigott, Seattle, for a rolling mill and open hearth furnace, to be located on a 32-acre tract north of Portland on the Willamette river. The plant is to roll steel for ships, except plates. Plans call for an expenditure of $700,000.

Metal Markets

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
Oct.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
9.....	26.00	26.00	81.00*	8.05	7.75	9.10	8.75
10.....	26.00	26.00	81.00*	8.05	7.75	9.05	8.70
11.....	26.00	26.00	81.00*	8.05	7.75	9.00	8.65
12.....	....	....	....	...	...	...	...
14.....	26.00	26.00	81.00*	8.05	7.75	9.00	8.65
15.....	26.00	26.00	81.00*	8.05	7.75	8.95	8.60

*Nominal.

NEW YORK, Oct. 16.

The markets are devoid of much interest or activity. There is less expectation of any change in the copper price after Nov. 1. The tin market is flat and halting. Lead conditions continue very tight. Spelter is easy with Government demand large. Antimony is lower.

New York

Copper.—A meeting of producers and the price-fixing authorities at Washington is scheduled for Oct. 25, it is understood. The belief is gaining strength that there will be no change now in the present fixed maximum price of 26c. per lb. after Nov. 1. The feeling that the war may end before many months seems to be the principal cause for this opinion. It is also the sentiment of many that an ending of the war will be of benefit rather than harm to the copper industry. Instead of a falling in prices after hostilities cease, it is expected that values will rise as the present price is considered by many below the real value under present conditions. One authority states that the supply of the metal is less than ever, due to heavy Government consumption.

Tin.—The market is absolutely flat and halting. There have been no offerings of future tin for over two weeks. A little metal now in transit or for spot delivery has been offered with sellers willing to make some concessions for both positions. They desire to part with it before a price is fixed which seems imminent. The quotation for spot tin remains nominal at about 81c. per lb., New York. As to Government or international control there are no definite or official developments. An announcement is expected soon, however, from Washington and the whole trade, including importers, will probably know in a week or ten days the exact situation. A questionnaire has been sent by the War Industries Board to all those handling tin in which a statement is requested of business done from June 1 to Oct. 1, with replies to be in by Oct. 15. Of course under such general conditions there is no desire to do any more business than necessary. Tin arrivals at Atlantic ports to Oct. 9 have been 350 tons. The London quotation for spot Straits yesterday was £336 10s. per ton.

Lead.—The lead situation is unchanged and is under the complete control of the Lead Producers' Committee which handles all distribution. Prices continue fixed by agreement at a maximum of 7.75c., St. Louis, or 8.05c., New York. There are no inquiries reported, all apparently going directly to the committee. Neither is any dissatisfaction heard of as to how the situation is being handled.

Spelter.—In the last week the market has continued to ease on small transactions and yesterday the quotation was about 8.60c., St. Louis, or 8.95c., New York, for prime Western for October and early delivery. Business has been light. A tone of steadiness and firmness has developed in the last day or so, due partly to prospective Government buying. The Army is to purchase 8000 tons of grade C for November-December delivery which is practically prime Western and the Navy will buy over 1000 tons for delivery over the next six months. For delivery in November-December the quotation is about 8.25c., St. Louis, or 8.60c., New York.

Antimony.—The Government is inquiring for 3000 tons and the market is firmer after falling to about 13.62½c., New York, duty paid, which is the present quotation for early delivery of wholesale lots.

Aluminum.—For No. 1 virgin metal, 98 to 99 per cent pure, and for scrap the Government maximum quotation is 33c. per lb. for 50-ton lots, 33.10c. per lb. for 15 to 50-ton lots and 33.20c. per lb. for lots of one to 15 tons.

Old Metals.—The market is unsettled owing to the international situation. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	26.00
Copper, heavy and wire	25.00
Copper, light and bottoms	22.50
Brass, heavy	17.25
Brass, light	13.00
Heavy machine composition	25.00
No. 1 yellow rod brass turnings	15.00
No. 1 red brass or composition turnings	23.00
Lead, heavy	8.00
Lead, tea	6.50
Zinc	7.00

Chicago

OCT. 15.—More copper is being used in this section than ever before, and all demands are being satisfied. Spot tin is exhausted and there is a persistent demand that is not being relieved. Unless the situation changes price bidding is expected and quotations may soar against Government wishes. The lead committee is handling that metal efficiently and all who are entitled to it are being supplied, but others have trouble. Spelter is quiet and at its lower price is apparently a good buy, but consumers are not disposed to avail themselves of the many offers. Antimony is more lively than it has been in some time. We quote copper at 26c. for carloads and 27.30c. for part carloads; tin, 85c. to 90c.; lead, nominal at 7.85c. in carloads; 8.35c. per lb. for 1 to 25 tons and 8.60c. per lb. for less than 1 ton; spelter, 8.65c. to 8.75c.; antimony, 15.50c. to 16c. On old metals we quote copper wire, crucible shapes, 21.50c.; copper clips, 21c.; copper bottoms, 21c.; red brass, 21c.; yellow brass, 15c.; lead pipe, 6.50c.; zinc, 5c.; pewter, No. 1, 40c.; tinfoil, 50c.; and block tin, 60c.

St. Louis

Oct. 14.—Non-ferrous metals are quiet with lead in carload lots quotable at the Government price, 7.75c.; spelter, 8.70c. to 8.80c. and a little weak. In less than car lots the prices are: Lead, 8.25c. in ton lots; 8.50c. for less than 1 000 lb.; spelter, 9.50c.; tin, 86c., but none to be had in this market; copper, 27.50c.; Asiatic antimony, 17c. In the Joplin district the weakness in spelter was reflected by a drop in the price of second grade ore, basis of 60 per cent metal, and zinc blende thus graded sold as low as $50 per ton, with the usual amount of top grade ore for the sheet zinc plants selling at $75 per ton. The average for the week for the district was $55 per ton. Calamine ranged from $34 to $40 per ton, basis of 40 per cent metal, with the average for the week for the district $37 per ton. Lead ore was steady at $100 per ton, basis of 80 per cent metal, with the average for the week for the district the same figure. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 20c.; heavy copper and copper wire, 22c.; pewter, 50c.; tinfoil, 65c.; lead, 6c.; tea lead, 5c.; zinc, 5c.

Core makers and molders of the Richmond Malleable Castings Co., Richmond, Ind., walked out, Oct. 9, the core makers objecting to a new foreman and the molders striking in sympathy. Both union and non-union men were employed in the foundry the output of which was largely rifle grenades. Union leaders said they had no jurisdiction in the matter because both union and non-union men were in the walk-out. No wage question is involved. The company says that every day the plant is idle the Government loses 15,000 rifle grenades.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

An advance in freight rates of 25 per cent from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, went into effect June 25, 1918. The rates from Pittsburgh, in carloads, to points named, per 100 lb. are as follows: New York, 24.5c.; Philadelphia, 23c.; Boston, 27c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barbed wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$4.40 base
Large boiler rivets	$4.50
7/16 in. x 6 in. smaller and shorter rivets	.50-10 per cent off list
Machine bolts h.p. nuts, ⅝ in. x 4 in.:	
Smaller and shorter, rolled threads	.50-10-5 per cent off list
Cut threads	.50-5 per cent off list
Larger and longer sizes	.40-10 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅝ in. x 4 in.:	
Smaller and shorter	.40-10 per cent off list
Larger and longer	.35-5 per cent off list
Carriage bolts, ⅝ x 6 in.:	
Smaller and shorter, rolled threads	.50-5 per cent off list
Cut threads	.40-10-5 per cent off list
Larger and longer sizes	.40 per cent off list
Lag bolts	.50-10 per cent off list
Plow bolts, Nos. 1, 2, 3	.50 per cent off list
Hot pressed nuts, sq., blank	.2.50c. per lb. off list
Hot pressed nuts, hex., blank	.2.30c. per lb. off list
Hot pressed nuts, sq., tapped	.2.30c. per lb. off list
Hot pressed nuts, hex., tapped	.2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank	.2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped	.2.00c. per lb. off list
Semi-finished hex. nuts:	
⅞ in. and larger	.60-10-10 per cent off list
9/16 in. and smaller	.70-5 per cent off list
Stove bolts	.70-10 per cent off list
Stove bolts	.2½ per cent extra for bulk
Tire bolts	.50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4½ in. and heavier, per 100 lb., $3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.90. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective May 21 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $17.00; 15-lb. coating, I. C., $18.60; 20-lb. coating, I. C., $19.60; 25-lb. coating, I. C., $20.60; 30-lb. coating, I. C., $21.75; 35-lb. coating, I. C., $22.75; 40-lb. coating, I. C., $24.00 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill. Refined iron bars, 5.00c.; common iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
Butt Weld					
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17
Lap Weld					
2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12
Butt Weld, extra strong, plain ends					
⅛, ¼ and ⅜	40	22½	⅛, ¼ and ⅜	22	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			
Lap Weld, extra strong, plain ends					
2	42	30½	1¼	19	4
2½ to 4	45	33½	1½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	34	3½ to 4½ in.	12½
2½ to 3¼ in.	24	3 to 3¼ in.	+ 5
2¼ in.	17½	2½ to 2¾ in.	+ 7½
1¾ to 2 in.	13	2 to 2½ in.	+22½
		1¾ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled	Per Net Ton		Per Net Ton
1 in.	$340	1¾ in.	$220
1⅛ in.	280	2 to 2½ in.	190
1⅜ in.	270	2¾ to 3¾ in.	180
1½ in.	220	4 in.	200
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows:

Blue Annealed—Bessemer	Cents per lb.
No. 8 and heavier	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.10
No. 30	5.20
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.05
Nos. 30½ and 31	5.10

Screw Thread Standardization

The National Screw Thread Commission conducted a public hearing in New York on Oct. 7, at which manufacturers and users of certain classes of threaded products were invited to give testimony in regard to the present practice in screw thread manufacture, and to suggest the lines along which standardization should proceed. The concensus of opinion of those present, on the subjects discussed, was as follows:

Relative to national standards, the U. S. System should be continued practically in its present form for the ordinary threaded work, to which it is well adapted. Objections were raised to its use for diameters less than half inch on the ground that for small work the U. S. pitches are too coarse and the threaded work too much weakened by excessive depth of thread. The S. A. E. System is satisfactory for use where finer threads are necessary, as for example, in automobile and aeroplane work. The A. S. M. E. System should be used to supplement the U. S. System for diameters less than quarter inch, and all sizes from 14 to 30 should be discontinued in order that there may be no overlapping of the two systems. A minority thought that all A. S. M. E. sizes should be retained.

Regarding the classification of fits the general opinion was that four classes of fits would be ample to provide for all ordinary threaded work, and that very probably three classes would be sufficient, since it was felt that wrench fits, stud fits, etc., which could not be covered by general specifications, should be classed as special and no attempt made to include them in the regular classification.

On the subject of standard hole practice there was a sharp difference of opinion on the question of whether the nut or the screw should be made basic, with the majority favoring the former. A part of the objection to make the hole basic arose from a misapprehension. It was suggested that if the tap or the tapped hole were made basic it would be necessary to carry in stock several sizes of bolts in order to provide for different classes of fits. Such, however, is not the case, since in general only a single class of fit will apply to each threaded product and only that class would be carried in stock. For example, machine screws should be made within certain tolerances, while bolts for agricultural machinery would require larger tolerances and there would be no necessity for providing for machine screw fits on agricultural machinery bolts, or for agricultural fits on machine screws.

On Oct. 21 at 10 a. m. a hearing will be conducted by the Screw Thread Commission in New York at the Engineering Societies Building, 29 West Thirty-ninth Street, on the following subjects: Pipe threads, brass tubing, hose couplings, and instrument threads.

Hardware Manufacturers' Meetings Postponed

The health authorities of New Jersey have withheld permission to hold the meetings scheduled by the hardware manufacturing and jobber interests at Atlantic City next week. The war service conference planned for Oct. 22 by the American Supply and Machinery Manufacturers' Association has accordingly been postponed until the epidemic of influenza shall subside and for the same reason the meetings on Oct. 23, 24 and 25 of the American Hardware Manufacturers' Association and the National Hardware Association have been postponed.

The Naval Gun Factory is in need of competent tool, jig and gage designers. Men who are graduates in mechanical engineering from a technical school or college of recognized standing and have had some drafting room experience, or men who are competent designers of jigs, tools and gages and have had a number of years' experience in the designing of shop tools are eligible for these positions. The pay ranges from $4.00 to $6.88 per diem, depending upon the qualifications of the draftsman. Additional information may be had upon addressing the Commandant and Superintendent, Naval Gun Factory, Navy Yard, Washington.

Pittsburgh and Nearby Districts

Alexander W. Dann, Dravo Contracting Co., Pittsburgh, has purchased a 24-acre site on the south side of the Ohio River near Stoop's Ferry. The property has frontage on the river and the Pittsburgh and Lake Erie Railroad. Mr. Dann stated, however, that the company will not leave Neville Island, where its principal plants are now located.

The Electric Materials Co., Northeast, Pa., manufacturer of electrical machinery and traction repair parts, is making three additions to its plant, one building being 20 x 90-ft. another 40 x 60-ft. and another 80 x 160-ft.

The Fuller Steel & Iron Co., Pittsburgh, was recently incorporated with a capital of $10,000 by James R. Fuller, William L. Fuller and Jerome Wolff, Crafton, Pa.

The Keystone Brass Foundry Co., Pittsburgh, was recently incorporated with a capital of $37,500 by Leo Einstein and others.

The Savage Arms Corporation, Sharon, Pa., is preparing to erect a new and modern building to its plant in that city. When completed it will be one of the largest plants in the Valley.

The plant of the Hayward Steel Co., New Cumberland, W. Va., which has been shut down for more than a year, has been placed in operation, and the plant of the Davis-Price Foundry & Machine Co. is preparing to manufacture mine cars.

Philadelphia Meetings of Steel Electrical Engineers

The Philadelphia section of the Association of Iron and Steel Electrical Engineers has announced a program of meetings. On Saturday, Nov. 2, there is to be a general discussion on "The Employment of Female Labor in the Electrical Departments of Large Industrial Works." On Dec. 7 a paper is scheduled from G. E. Stoltz, general engineer, steel mill section, Westinghouse Electric & Mfg. Co., East Pittsburgh, on "Plate Mill Drive." On Jan. 4, 1919, machine tool drives are to be discussed by H. W. Tice, efficiency engineer electrical department, Lehigh plant, Bethlehem Steel Co.; on Feb. 1, a paper is announced by John H. Anderton, chief electrical engineer, and H. W. Osgood, electrical engineer of the American International Shipbuilding Corporation on "Electrical Features of Hog Island"; and on April 5 H. B. Vincent, operating engineer with Day & Zimmerman, Inc., Philadelphia, is to address the association on "Power Transmission."

The Russell Motor Car Co., Toronto, for the fiscal year ended July 31, 1918, reported a net gain of $628,581.55 which was $15,000 less than for the previous year due in part to profit taxes, etc. Under the classification of manufactured goods, raw materials, supplies, insurance and fuel there has been a reduction during the year of about $1,282,000, the present total being $144,966.46 as compared with $1,426,449.19. Real estate and buildings have been written down from $310,177.51 to $54,583.25, and machinery, tools, patterns, etc., from $346,009.70 at the end of the fiscal year 1917, to $192,661.61. With a view to preparing for after-the-war business, the company acquired substantially all of the capital stock of the Machine & Stamping Co., Ltd., doing a business in machinery and stamping of small metal parts, largely of a character not previously made in Canada.

The shortage of essential metals in Germany, according to the *Engineer*, London, has led to the introduction of the ingenious device of using iron tubes with a wood lining, instead of tubing of copper, brass, lead, vulcanite, etc. The wooden lining is said to act as an adequate protection against corrosion. Its value as an insulating medium in protecting against extreme heat or cold is obvious. Junctions are made by means of V-shaped projections which fit into corresponding notches.

SCRAPPED WAR MATERIAL

Millions of Dollars' Worth of Supplies Now Obsolete—Plans for Partial Utilization

WASHINGTON, Oct. 15.—The War Department has issued an interesting report of the salvage work which is being done. It is cleaning up millions of dollars worth of material from the expensive "scrap heap" of the aircraft department. The figures set by the report upon the value of the "surplus supplies" of the Division of Military Aeronautics is $10,000,000 turned up since Aug. 6. The examiners have not yet finished their task and the figures will be much larger. The supplies already listed include airplanes, motors, typewriters, motor cars, motor trucks, oil, lumber, wood, iron and steel working machines, motorcycles, building material and about everything in the accessory line from screw eyes to stove bolts.

The official name of this system, which has begun to conserve supplies is the surplus inactive supplies service, purchase and storage branch, purchase, storage and traffic division of the General Staff. It has branches in most all bureaus of the War Department, the object being to utilize duplicate supplies purchased through the unavoidable lack of organization in the emergency and rush at the beginning of the war. These surplus supplies as fast as they are found, are listed and through a system of trade, transfer and sale either put to use in the Department or sold in the public market.

Obsolete Airplanes and Motors

The most important salvage so far inventoried by this organization out of the aeronautic records includes parts for 3500 French Gnome airplane motors listed at the time they were ordered in this country by the French High Commission, $10,500,000, but which now must be sold as junk for from $25 to $120 a ton. There are 2000 tons of these motor parts. This motor was at one time one of the most popular motors in France, but now, owing to the rapid advance in design and construction, the type is becoming obsolete. Very few of these motor parts are finished. Some are yet in the form of steel billets; some are finished as high as 90 per cent; some as low as 5 per cent; some have been boxed and sent across seas. All will now have to be scrapped. Eventually they will be paid for by the French Government, the money to buy them having been advanced by the United States.

With these Gnome motors go 300 Penguin training planes worth $750,000, a type that is now obsolete, and 128 L.W.F. airplanes worth approximately $1,427 000. In this collection also appear 1500 J.N.1. airplanes valued at $9,000,000 but now obsolete, and 500 additional motors valued at $750,000. It is hoped, however, to utilize these 2000 motors as engines in submarine chasers and coast patrol boats. The 1500 planes may also be utilized if a suitable engine is ever developed for them.

Discoveries in a Supply Depot

Other surplus supplies located included seven carloads of iron, steel and woodworking machinery found in a supply depot at Hampton, Va. In one of these cars was a wire testing machine badly wanted in France. Incidentally, 5,000 steel drums wanted for oil containers were discovered in private storage. While they were not the property of the Governmentt, nevertheless they were put into immediate use and the owner paid for them afterwards.

Another saving made by these conservation officers was due to the fact that electric batteries deteriorate rapidly when packed in bulk becoming practically worthless for issue after two months' storage. In the past it has apparently been the custom to purchase these batteries in great quantities. The price paid was 40 cents a piece. Conservation officers on August 27 found at the New York Supply Depot 150,000 of these batteries and it was estimated 75,000 of them, costing about $30,000, would be practically worthless when the time came to issue them. Manufacturers have now been instructed to ship these batteries in bulk directly overseas only upon emergency order, which will insure quick transportation and quick use, and will, it is believed, eliminate about 90 per cent of the battery losses and trouble.

Within its own division, since Aug. 15, Military Aeronautics has sent out lists of 1200 different surplus items, including more than 50,000 separate units, amounting in value to over $3,000,000. Each of the seventy-five branches in this division was asked what articles, if any, it wanted and so far 532 orders for over 30,000 separate units at a value of $750,000 has been returned calling for some of this surplus material. The work of transferring this material from those who do not want it to those sub-divisions who do is now under way and this readjustment will continue until the total supply of all branches is reduced to stock on hand sufficient for three months in advance.

Already the Division of Military Aeronautics has turned over to the Surplus Inactive Supplies Service of the General Staff property amounting to $2,087,341.35 which none of its own branches could use. Some of the larger items on this list were 150,000 gal. of oil worth $75,000; 417 typewriters valued at $25,000; 200 tons of hay valued at $3,000.

The division also located and put to use 4,500,000 ft. of ⅜-in. rope effecting a saving of $75,000. Another consignment of goods located and immediately put to use was 500 pairs of field glasses worth $37,500. This was found in a supply depot at Omaha. Other emergency supplies to the value of $75,000 were discovered in this same station and immediately shipped overseas.

W. L. C.

New Interest in After-the-War Conditions

(*Continued from page* 983)

lican du Commerce, de l'Industrie et de L'Agriculture has published the results of an investigation among the various commercial and industrial organizations as to their views in regard to the changes in the economic structure of the country necessitated by the war and preparations for the future. A number of parliamentary committees have reported on desirable changes in the customs law and the improvement of trade-promotion agencies. The Government is evidently making preparations for the revision of the customs tariff, as evidenced by the recent notice regarding the forthcoming abrogation of commercial treaties providing for most-favored-nation treatment. The Ministry of Commerce has a large staff of economists and publicists working on economic problems that will come in for discussion during peace negotiations."

The work that has been done in Central Powers the report discusses under the headings of "Imperial Ministry of Economics," "Bank Amalgamation," "Export Trade Organization," "Compulsory Syndication," "Water Transportation," and "Restoration of Merchant Marine."

Steel Corporation Service Flag

A large new service flag of the United States Steel Corporation suspended in the street at 71 Broadway, New York, this week, bore the figure 25,985, representing the number of employees of the Steel Corporation who have gone to war. The list of dead, so far as names can be verified, numbers 60, and that figure appears in the red portion of the new flag. The first service flag of the Steel Corporation, which was displayed across Broadway in December 1917, represented 11,490 men, or considerably less than one-half the number now in the service.

The Hidalgo Steel Co., 253 Broadway, New York, has been appointed Eastern and export representative of the Louisville Steel & Iron Co., maker of wrought iron and steel bars, Louisville, Ky. The company's plant has been running to full capacity and has sufficient orders for the remainder of the year.

PERSONAL

A. O. Backert, who was elected president of the American Foundrymen's Association, at its annual convention in Milwaukee last week, is a native of Cleveland and was educated at Western Reserve University of that city. After engaging in daily newspaper work in Cleveland for several years, he became identified with the business press through the Penton Publishing Co., and has been active in that field for 19 years. For six years he was located at Pittsburgh as representative of the *Iron Trade Review* and *Foundry*. Subsequently he served for two years as western editor of THE IRON AGE. He became editor of *Foundry* in 1907 and served in that capacity ever since, and for several years acted as engineering editor of the *Iron Trade Review*. At the present time he is vice-president and general manager of the Penton Company. He became secretary of the American Foundrymen's Association in 1914 and has served continuously until the present time. Mr. Backert organized and became secretary-treasurer of the Foundry Supply Manufacturers' Association. At the present time, he is secretary and treasurer of the Molding Machine Manufacturers' Association and is secretary of the Foundry Equipment Manufacturers' Association which has just been organized for the period of the war. He has contributed papers to the American Foundrymen's Association particularly on molding machine practice and cost work. It was largely from his investigations and studies that the standard cost system for foundries now being widely adopted, was initiated.

Harry Urban, Birmingham, Ala., has been appointed general manager of the Woodward Iron Co. He was formerly superintendent of the Fairfield by-products plant of the Tennessee Coal, Iron & Railroad Co. E. J. Best has been appointed chief engineer for the Woodward Company.

B. K. Stroud, Fort Smith, Ark., has been appointed manager of the Alabama Manufacturers and Operators' Association and has assumed charge of his duties. This organization has a membership of 300, representing nearly every industrial enterprise. The manager's duties will be to keep them in touch with the purchasing end.

J. W. Buckland, formerly assistant works manager of the Angus shops of the Canadian Pacific Railway Co., Montreal, Que., has been appointed chief engineer of the shell plant of the P. Lyall & Son Co., Longue Point, which will turn out 1.55 mm. shells.

O. T. Webb, Milwaukee, dealer in new and used machine-tools and shop equipment, has moved his offices and headquarters from 25 Mack Block to a new building at 224 Fourth Street, where display and storage space is available. For ten years he was vice-president of the O. L. Packard Machinery Co., now the Badger-Packard Machinery Co., but for several years has conducted business on his own account. W. T. Reimer, formerly connected with the M. J. Walsh Machinery Co., 144 Sycamore Street, and now an individual dealer in tools, will be associated with Mr. Webb.

William Roger, has been appointed plant and maintenance engineer with the Halifax Shipyards, Ltd., Halifax, N. S. Prior to his appointment he was superintendent of the Star Mfg. Co., Dartmouth N. S.

C. P. Perin, who has been in India for quite some time in connection with the Tata Iron & Steel Co., Calcutta, India, left Bombay on Sept. 3 and is expected to arrive in London on his way to New York by way of Cape Town, at the end of October. F. L. Lindemuth, of C. P. Perin and S. M. Marshall, consulting engineers, New York, will leave New York about Oct. 19 to meet Mr. Perin in London.

A. W. Dietzel, for several years superintendent of works, Waukesha Motor Co., Waukesha, Wis., has become associated with the I. B. Rowell Co., Waukesha, as works manager. The company manufactures farm implements and machinery and automotive specialties.

B. H. Tripp has been appointed by the Chicago Pneumatic Tool Co., as district manager of sales for Pacific Coast territory, succeeding M. W. Priseler.

G. L. Hanson, according to an announcement just made by the Advance Machinery Co., Van Wert, Ohio, manufacturer of milling cutters, reamers and small tools, has become connected with the company as manager. He has also been elected a director.

William G. Clyde, general sales manager, Carnegie Steel Co., Pittsburgh, is at the West Penn Hospital, Pittsburgh, recovering from an operation for appendicitis.

William J. Fairbairn, secretary Milwaukee Metal Trades and Founders' Association, has been selected by the Department of Labor as one of three industrial advisors to the District Exemption Board at Milwaukee. The duties of the advisors are to investigate and pass on all applications for deferred classification under the selective service act and present such claims to the district board.

A. C. Bell, Wisconsin Bridge & Iron Co., Milwaukee, was elected president of the Society of Iron and Steel Fabricators of Milwaukee at the annual meeting on Oct. 10. Other officers were elected as follows: Vice-president, William Hackendahl, Hackendahl & Schmidt Co.; treasurer, Robert W. Reed, Lakeside Bridge & Steel Co.; secretary, E. F. Zuleger, Worden-Allen Co. Reports presented to the meeting indicated that all shops belonging to the association are engaged in 100 per cent war work.

Horace N. Trumbull, advertising manager of the S K F Ball Bearing Co., Hartford, Conn., has entered the reserve officers' training camp at New Haven, Conn.

Warren A. Peters has been appointed sales manager of the Star Expansion Bolt Co., 90 West Street, New York. He was associated with the Ames Iron Works, Oswego, N. Y., and recently resigned as New England sales manager of that organization.

H. M. Thomas, formerly connected with the Hubbard Steel Foundry Co., East Chicago, Ill., and for the past six years superintendent of the rolling department in that city, has accepted a position as engineer of the roll and mill department of the Mesta Machine Co., Pittsburgh.

John J. Agnew, for several years connected with the Pittsburgh Iron & Steel Foundry Co., at Midland, Pa., latterly as manager of roll sales, has accepted a position with the Mesta Machine Co., Pittsburgh, on the sales staff in the roll and mill department.

The Chicago Pneumatic Tool Co., announces the appointment of A. G. La Pierre to be traffic manager, and F. O. Southbrook, to be manager order and production department. Their headquarters will be in the home office of the company, Fisher Building, Chicago.

E. P. Cooke has been appointed sales manager of the Fawcus Machine Co., Pittsburgh. After leaving his engineering position with the Corn Products Co., of Chicago, he organized the Armstrong Cooke Steel Co., and retains his interest in it.

R. F. Hayes has taken over the used machinery department of the Charles H. Walker Machinery Co., Detroit, and will operate under the name of the Hayes Machinery Co., with headquarters at 42 East Larned Street, Detroit.

Willis Werner has been appointed chief chemist of the Republic Iron & Steel Co., Youngstown, Ohio, and placed in charge of the blast furnace and open-hearth laboratories. He succeeds T. J. Davies.

The Koppel Industrial Car & Equipment Co. is the name of the subsidiary of the Pressed Steel Car Co., which will take over the business of the Orenstein Arthur Koppel Co., builder of industrial cars and equipment, Koppel, Pa. The plant was recently sold to the Pressed Steel Car Co. by the Alien Property Custodian.

Steel Ingot Output in September

The production of steel ingots in September, according to statistics compiled by the American Iron and Steel Institute from reports submitted by 29 companies which made about 85.10 per cent of the steel ingot production in 1917, was at an annual rate of 46,483,500 gross tons, exceeding the August rate of production of 41,984,000 gross tons by 4,500,000 tons a year, or over 10 per cent. This estimate is based on the output of 3,200,438 gross tons by these companies for September, a working period of 25 days for the month and 309 days for the year. The daily rate of output for September of these companies was 128,018 tons or 150,432 tons daily for the entire industry. The table below gives the ingot production of these 29 companies for the past 15 months:

Monthly Production of Steel Ingots—Gross Tons

Month	Open-hearth	Bessemer	All Other	Total
July, 1917	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
September	2,195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195,832	524,084	13,806	2,733,722
January, 1918	1,763,356	429,588	10,901	2,203,845
February	1,805,233	454,457	14,051	2,273,741
March	2,331,048	763,255	16,078	3,110,381
April	2,377,974	769,249	16,187	3,163,410
May	2,475,131	796,244	15,858	3,287,233
June	2,281,718	786,380	15,348	3,083,446
July	2,311,545	784,997	17,093	3,113,635
August	2,299,177	766,860	17,643	3,083,680
September	2,410,773	772,863	16,802	3,200,438

Chrome Ore in Rhodesia

WASHINGTON, Oct. 15.—The potentialities of Rhodesia as a mineral country have once again been demonstrated by the discovery of what is stated by experts to be the largest deposit of high-grade chrome in the world, says the Rhodesia *Herald*, according to a report received by the Department of Commerce. The deposit is situated in the Umvukwes, and the discovery was made by Albert Peake of Umvukwe Ranch, Lomagundi, over 12 months ago. Great interest was exhibited in the find in mining circles, as was naturally to be expected, and a great future for the industry was confidently predicted, and its success, of course, would be reflected in the enhanced prosperity of the territory.

During the past 12 months, systematic and energetic development has proceeded, and Messrs. Peake Bros. are now in a position to state that they have already fully exposed over 2,000,000 tons of exceptionally fine quality chrome. Work is continuing rapidly, and enormous additions to the proved tonnage are constantly being made.

Retrenchment in Ball and Roller Bearings Ordered

WASHINGTON, Oct. 15.—The War Industries Board has ordered a retrenchment in the use of iron and steel for ball and roller bearings. The manufacturers must pledge themselves to sell their product to no one except for essential uses, as defined by the priorities division. The board has also issued a ruling forbidding tobacco manufacturers to extend or to create new facilities without special permission, and they are also required to use present instead of employing new facilities and also to eliminate the use of iron, steel and tin in the packing and marketing of tobacco. Last year the tobacco industry consumed 74,059 tons of steel and 1,333 tons of pig tin in its packing.

The Scullin Steel Co., St. Louis, has purchased a site adjoining its plant at 6700 Manchester Avenue on which it will erect an administration building.

The Everett Moses Co., has bought ground and begun erection of an oxweld acetylene plant of considerable size at Birmingham, Ala.

Rules Governing Machinery for Export

A matter of interest to the machine tool trade has been brought to the attention of THE IRON AGE by George E. Merryweather, chief of the machine tool section of the War Industries Board. Considerable equipment, it appears, is being stored in New York and other ports instead of being put in actual service. In supplying machines for foreign shipments the manufacturer is urged to be sure that an export license has been granted by the War Trade Board, and that the license number be obtained before the machine is shipped or even before the machine is started in production, especially if the machine is of a very special nature. The resolution adopted by the War Industries Board last spring, and the recent plan adopted coordinating the activities of the War Trade Board, which are as follows, cover the point in detail:

Exports: In accordance with the action of the Board on March 26, Judge Parker submitted the following resolution discouraging the purchase of materials for export, the same to be paid for and put in storage until after the war:

Whereas, it has come to the notice of the War Industries Board that orders have been and are being placed for the production and delivery in the United States of materials, equipment and supplies intended for export, either actually or nominally to neutral countries, but for which no export license will be issued during the war; and

Whereas, many of the products for which such orders are placed are manufactured in accordance with special designs and specifications rendering it impossible for them to be utilized to advantage or at all in this country; and

Whereas, the said materials, equipment and supplies are being stored for export at the termination of the war; and

Whereas, this practice results in the utilization of materials and labor urgently needed for the production of the war requirements, direct or indirect, of the United States and the Allies;

Now, therefore be it resolved by the War Industries Board that the practice here mentioned is to be deprecated and should be discouraged.

Be it further resolved, that the industries of this country be requested to accept no order for the manufacture of and to make no contract of sale and to make no sale or delivery of any materials, equipment or supplies intended for export until the proposed purchaser has first procured from the War Trade Board an export license or from the War Industries Board a permit to make such purchase.

A plan has been adopted, effective at once, as follaws:

1. The proposed exporter will now be required to make but one application and that in the form of an application for an export license to the War Trade Board.

2. The War Trade Board will in co-operating with the priorities committee and other appropriate representatives of the War Industries Board, including the director of steel supply, make proper investigation and give to the application consideration.

3. If the conclusion is reached that an export license should issue it will carry with it such priority rating as may be determined by priorities committee.

4. No order for special manufacture of any article intended for export shall be placed or accepted until an export license covering same has been issued.

The New Donner-Union Coke Plant

Construction has begun on the by-product coke plant of the Donner-Union Coke Co., Buffalo, which is to be located on an extensive site at Abby and Lehigh streets, on the Lackawanna and the Buffalo, Rochester & Pittsburgh railroads, adjoining the blast furnace plant of the Donner Steel Co., on Buffalo River. It will consist of 150 Koppers by-product coke ovens. The H. Koppers Co., Pittsburgh, has the entire contract for construction, with the exception of the concrete piling and foundation work.

The Amalgamated Machinery Corporation, Chicago, has purchased the steel foundry of the Heyward Steel Co., New Cumberland, W. Va. The property was only recently acquired by the Heyward Steel Co. The foundry has a 20-ton acid open-hearth furnace.

OBITUARY

Millard Hunsiker

MILLARD HUNSIKER, one of the junior partners in the Carnegie Steel Co. and for many years foreign representative for that company and later for the United States Steel Products Co., died Oct. 11, 1918, at Harrogate, England. Mr. Hunsiker was born at Athens, Pa., and 25 years ago first became connected with the Carnegie Steel Co. as engineer of tests. Later he was placed in charge of the armor plate department and was selected as assistant to the president of the company. A year or so later he was sent abroad to open the European office of the Carnegie Steel Co. in London and handled all of the company's foreign business until 1901, when the United States Steel Corporation was formed. At that time the United States Steel Products Co. was organized as a subsidiary of the corporation to handle export business and Mr. Hunsiker became its foreign representative, covering England, France, Italy and Russia. He held that position at the time of his death. He lived in London, but had gone to Harrogate to take a short vacation. A cablegram announcing his death gave no details as to the cause.

MILLARD HUNSIKER

One of the last visits Mr. Hunsiker made to the United States was in 1916, when he brought a number of large contracts for armor plate. Although he had spent 22 years in England, he made frequent trips to this country and retained a host of friends, particularly in New York and Pittsburgh. He was well known to steel men in all parts of the world and was a personal friend of Andrew Carnegie, Charles M. Schwab, Henry C. Frick and John G. A. Leishman.

During the time that Herbert Hoover, now head of the Food Administration, was in Belgium Mr. Hunsiker served under him as vice-president of the Belgian Relief Association. He was also treasurer and manager of the Army and Navy Officers' Club in London. He was one of the founders of the Pilgrims' Association and a member of the Carnegie Veterans' Association.

MAJOR HENRY CLAY EVANS, whose death on Oct. 8 was noted in this column in the issue of last week, was born in Pittsburgh on May 4, 1850. He was connected with the steel industry for 34 years and for some years was sales agent in New York for the Lorain Steel Co. It was natural that he should be prominently identified in the electric railroad field, where the girder rail has been used, and he was a member of the excutive committee of the American Electric Railway Manufacturers' Association from 1906 to date and in 1911 served as vice-president of the association in charge of relations with the American Electric Railway Association. He was for a number of years connected with the Pennsylvania State militia on the staff of the major general of that state. He was a member of the Engineers Club of Boston, the Railroad Club of New York and of other local social institutions.

SHERMAN C. SCHAUER, vice-president and general manager, Cincinnati Bickford Tool Co., Cincinnati, died at his residence in that city, Oct. 11, after an illness of about six months. He was a native of Hamilton, Ohio, and was 53 years old. He was for some time superintendent of the Hamilton Machine Tool Co., and in 1898 became connected with the Cincinnati Machine Tool Co., in an official capacity. Later in co-operation with August H. Tuechter, president, Cincinnati Bickford Tool Co., that company was formed by the consolidation of the Cincinnati Machine Tool Co., and the Bickford Drill Co. Mr. Schauer was a member of the Cincinnati Business Men's Club and a number of other business and social organizations. He is survived by his widow, a daughter and three sons.

WILLIAM WATSON ALLIS, eldest son of the late Edward P. Allis, founder of what is now the Allis-Chalmers Mfg. Co., Milwaukee, died at his residence in Milwaukee on Oct. 10, at the age of 70 years. Upon the death of his father, Mr. Allis succeeded him as president of the E. P. Allis Co., continuing in that position until the formation of the Allis-Chalmers Co., when he was made chairman of the board of directors. He retired from active connection with the company prior to its reorganization as the Allis-Chalmers Mfg. Co., in 1913. Mr. Allis was born in Milwaukee. A brother, Charles Allis also widely known in the machinery industry, passed away two months ago.

HORACE WILSON, formerly chief clerk and cashier of the American Iron and Steel Institute, New York, died of pneumonia at Elizabeth, N. J., Oct. 8, aged 34 years. Mr. Wilson was very popular among members of the institute and established a record of rare efficiency. He resigned last May to accept the position of assistant to the manager of the E. I. du Pont de Nemours Co. His home was in South Amboy, N. J., and his death is attributed to exposure resulting from being moved to Elizabeth, made necessary by the recent explosion at the plant near Morgan, N. J.

LIEUT. PHILIP J. DAVIDSON, treasurer Union Drawn Steel Co., Beaver Falls, Pa., was killed in action in France, Aug. 5. Although but 27 years of age Mr. Davidson was one of the best known young business men in Beaver Valley, being a director of a number of banking and manufacturing institutions. He was a son of the late Congressman J. J. Davidson. He was a member of the Pittsburgh Athletic Association, the Duquesne Club, Pittsburgh, and local clubs. He leaves a widow and one son, age 2½ years.

Edward B. Cook

EDWARD BAILEY COOK, assistant manager of the blast furnace department of Pickands, Mather & Co., Cleveland, having supervision over the blast furnaces of the Toledo Furnace Co., Toledo, Ohio; United Furnace Co., Canton, Ohio, and Perry Iron Co., Erie, Pa., died Oct. 13 of pneumonia, following an attack of Spanish influenza. He was ill only a week. Mr. Cook, who was 39 years of age, graduated from the Massachusetts Institute of Technology, Boston, and then became a furnace worker at the plant of the Warwick Iron & Steel Co., Pottstown, Pa., now operated by the Eastern Steel Co., and of which his father, the late Edgar S. Cook, was president. After being connected with the plant five years he was made general manager. He severed this connection in 1912 to take the position with Pickands, Mather & Co., which he held until his death. He was a man of unusual geniality and made friends with all with whom he came in contact. He was a member of the Country, Union and Cleveland Athletic clubs and Cleveland Chamber of Commerce and a member of Toledo, Erie and Canton clubs and before his sickness was an active worker in the present

EDWARD B. COOK

Liberty loan campaign. He was married in 1906 and leaves his widow and five children. The body was taken to Pottstown for burial.

ALFRED R. JONES, president, Hilles & Jones Co., Wilmington, Del., maker of machine tools for working plates, bars and structural shapes, died Oct. 9, aged 55 years after an illness of five days with Spanish influenza. Mr. Jones' connection with the company began in 1887 as bookkeeper. Later he became treasurer and upon the retirement in 1902 of his uncle, Henry C. Jones, one of the founders of the business, became president, which office he filled to the time of his death.

WILLIAM P. TUECHTER, president Century Machine Co., Cincinnati, maker of bakers' machinery, died at his residence in that city, Oct 13, aged 42 years. He had been engaged in the manufacture of bakers' machinery for a number of years. He organized the Triumph Mfg. Co., Cincinnati, and later formed the company with which he was connected at the time of his death. A. H. Tuechter, president of the Cincinnati Bickford Tool Co., is his brother.

HARRY H. LATHAM, Chicago, president of the Latham Machinery Co., died at his home Oct. 9 of Spanish influenza. Mr. Latham was born in Sandwich, Ill., 1859, was educated at Northwestern University, and in his early years practiced his profession as a civil engineer throughout the then wild west, coming to Chicago in 1884. He has been president of the Latham Machinery Co., since its incorporation in 1894.

EUGENE L. STEINDLER, president, the Arcwell Corporation, New York, died Oct. 2 of influenza, aged 31 years. Mr. Steindler was the founder of the Arcwell Corporation which was organized last May to manufacture a new electric alternating current arc welder. He was also a director and general manager of the Dominion Reduction Co., Cobalt, Ont., and the Blue Stone Mining & Smelting Co., of Colorado.

SERGT. JAMES A. KILDA died from pneumonia, at Camp Meade, Oct. 5. Sergeant Kilda was formerly connected with the Philadelphia office of Hickman, Williams & Co., and left on Jan. 1, 1918, to enlist in the army. Previous to being with Hickman Williams & Co., he was connected with the Pennsylvania Steel Co. and the Bethlehem Steel Co.

MR. LEWIS JAMES, of the Nicholson File Co., died in the Jefferson Hospital, Philadelphia, Sept. 30. Mr. James was well known in the hardware trade, representing the company between Philadelphia and San Francisco.

The annual report of the Cockshutt Plow Co., Brantford, Ont., H. Cockshutt, president, shows net profits after providing for depreciation of $553,215 compared with $370,745 in 1917, and $465,211 in 1916; in the latter two years, however, the amounts given were increased by $34,965 through dividends from affiliated companies. Out of profits $258,600 was paid out in a quarterly dividend of 1 per cent on the preferred stock, and $200,000 was added to the contingent reserve. The balance available for profit and loss amounted to $94,615, which added to the amount brought forward, made a total surplus of $586,401. Of this amount it was decided to carry forward $500,000 to capital reserve, making the total of that account $1,500,000.

Hamilton County, Ohio, in which Cincinnati is located has subscribed $2,000,000 above its allotted quota, 136,000 individual subscriptions were received up until Tuesday noon, a much larger number than in previous campaigns. The President's reply to Germany created much enthusiasm and soliciting teams are finding many investors eager to double their first subscriptions.

An inspection of factories and shops in St. Louis will be undertaken immediately for the double purpose of guarding against the spread of influenza and to make suggestions for the permanent improvement of sanitary conditions and ventilation.

PLANNING A WELDING SYSTEM

Selection of Arc Welding Units for Railroad Shops—Operation of System

Information of value in the planning and operating of an electric arc welding system is contained in a paper on "War and Welding" presented before the Western Railway Club by E. Wanamaker, electrical engineer of the Rock Island lines. Although the discussion was limited to a system planned largely because of war conditions for railroad shops, the analysis of the needs and factors governing the decisions are of general value.

In planning the installation the metal electrode process was selected in preference to the carbon electrode, Mr. Wanamaker said, because with the latter welding can be done in the horizontal plane only and in general the work is inferior to that which is possible with the metal electrode process. A careful analysis was made of the service which is demanded of electric welding equipment in railroad shops and engine houses, and an attempt was made to design an installation which would show under such conditions maximum reliability and flexibility with minimum installation and operating expense. It appeared certain that the welding process would find a wider field of application than was apparent at that time and the installation was made in such a manner as to lend itself readily to enlargement should that become necessary.

"It was considered particularly desirable," he explained, "to have the arc welding equipment available at all points in the shops and engine houses, since it was quite evident that the advantage of the low cost of the arc welding process would be lost if, for instance, the locomotive had to be moved from a haphazard location to a point where the welding power would be available. These features led to an analysis of distributing systems for the welding power and showed the necessity of using portable arc welding equipment, similar, so far as possible, to the portable gas welding outfits. With the total capacity divided at each shop among several units, it appeared certain that so long as power was available, there would not be a complete shutdown of the welding equipment. Each operator would be entirely independent of the others, although as many as necessary could be concentrated on any engine or job in the shop.

"The operating economy, while not a deciding factor, was important, since at some shops the power plants were loaded to their capacity and at other points the power purchased from small central stations was rather dear. Under these conditions, the variable voltage type of equipment was considered the best because this type eliminated the resistance ballast from the arc circuit, thus increasing the power economy of the units to such a degree that a single operator unit may be operated from a power line large enough to carry a 5 hp. motor.

"As a result of the analysis of the requirements of the shops and car repair yards, 33 individual unit welders were installed, 10 of which were mounted on brackets on columns in the largest locomotive shop, while the other 23 were portable machines weighing complete with truck, approximately, 1700 lb. All of these units are motor generators having inherent regulation and an arc stabilizer. Part of the machines are equipped with 230-volt direct-current motors and part with 440-volt three-phase, 60-cycle motors, these two kinds of power being the standard on the Rock Island lines.

"With portable welders," Mr. Wanamaker stated, "the installation of electric welding equipment is converted into a system proposition rather than a series of plants to take care of certain shops or terminals. The plan is extraordinarily flexible and has many desirable features that would be impossible to obtain with any other plan or type of equipment. For instance, if it is found that one or more welders are needed at some shop, it is very probable that some can be transferred from another point which has more than can be used to advantage at that particular time, it is only necessary to pull the units to be transferred into a car, block them substantially, and bill to the point where needed. Immediately on receipt they are ready for operation."

Machinery Markets and News of the Works

SEMI-STEEL SHELLS

An Output of 30,000,000 Is Planned

Bulk of Machinery Transactions Small — More Large War Contracts — Heavy Demand for Tools in Canada—Alameda Plans Curtailed

The Government program for the production of semi-steel shells is now the most engrossing item of war work now before machine-tool manufacturers. The schedule calls for 30,000,000 of 4.7, 6 and 8-in. caliber. The two larger sizes are to be completely machined, the 6,000,000 4.7-in. shells only partially so. It is estimated that for an output of 250,000 6-in. shells a day 22 machining tools and 10 toolroom machines will be needed. Many shops are already fairly well equipped to handle the work.

While no contracts for these shells have as yet been announced, the whole plan is being energetically pushed and plants properly equipped will undoubtedly start operations shortly. It is understood that the Government will help those foundries which are provided with the necessary floor space and will install a machining plant for the finishing work. Standard operations, time studies and costs for the work have been worked out, but will not be given publicity until the best method of molding and casting have been settled on. If the tools cannot be obtained from the regular sources, it is understood that the Government will initiate steps to have the equipment produced by manufacturers not now making machine tools.

The bulk of machinery transactions for the time being is made up of orders for a few tools. These are required for the most part for upkeep or rounding out shops. The demand for turret lathes and screw machines in lots of this size is unusually heavy.

The Ordnance Department, United States Steel Corporation, is placing further orders for equipping the Neville Island gun and projectile plant.

The Ordnance Department, Washington, has ordered 75,000 light Browning rifles and 15,000 aviation guns from the Marlin-Rockwell Corporation, New Haven, Conn.

An especially heavy demand for machinery has developed in Canada. The manufacture of 155-mm. shells is bringing out a great number of inquiries. It is reported from Ottawa that there will be a revival of munition orders in the Dominion for the British Government as well as for the United States.

The Canada Cement Co., Montreal, Que., has received a contract for 9.2-in. and 12-in. shells for the United States at a total cost of $10,000,000, and will erect a shell plant to cost $1,000,000.

The Government is seeking to place contracts in the Birmingham, Ala., district for 3-in. shells to give an output from that district amounting to 80,000 a day.

No large orders were placed the past week for cranes. It is now expected that 200 or more small cranes for the Neville Island gun and projectile plant will be distributed among practically all of the makers. The program for constructing the Alameda plant of the Bethlehem Shipbuilding Corporation has been temporarily curtailed, and among other items orders for about one-third of a million dollars' worth of cranes have been cancelled.

New York

NEW YORK, Oct. 14.

The first steps are now being taken looking toward the placing of semi-steel gas and smoke shell contracts in this section. Two contracts for a total of 600,000 4.7-in. shells have been arranged with two manufacturers. The actual placing of the orders has been held up pending the passing of deficiency appropriations by Congress necessary to carry out the program.

Purchases of pistol-making machinery, which were indicated on a large scale by the recent placing of Government contracts for Colt pistols, have not yet been made, at least by the contracting companies. It is considered not improbable that the buying may be done for them by the Government. The Winchester Repeating Arms Co., New Haven, Conn.; the Savage Arms Corporation, Utica, N. Y., and San Diego, Cal.; the Lanston Monotype Machine Co. and the S-S-E Co., both of Philadelphia; the Burroughs Adding Machine Co., Detroit; the National Cash Register Co., Dayton, Ohio; Carem Brothers, Montreal, Que., and the North American Arms Co., Quebec, Que., have all been awarded contracts.

Thomas A. Edison, Inc., Orange, N. J., has taken a contract for adapters for 75-mm. shells, and will be in the market for a good-sized lot of machine-tool equipment.

Recent business by local machinery dealers has fallen substantially below the average of a month ago. October sales in the case of a number of them show only one or two sizable round-lot orders characteristic of past months. A good booking of machines for upkeep and rounding out shop facilities for the moment makes up the bulk of business. The renewal of shell contracts in this section tends to strengthen purchases of this type. The International Arms & Fuze Co., Bloomfield, N. J., the American Can Co., New York, and several others are reported to have received additional work of this kind.

The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., has cancelled orders for cranes for its Alameda plant aggregating one-third of a million dollars in value. It is reported that this radical curtailment of its plans was the result of the cost of the plant so far exceeding estimates that the construction of the boiler plant, foundries and pattern shop have been stopped until arrangements can be completed for carrying out the full building program. In the meantime the construction of the shipbuilding plant is proceeding along lines previously laid out.

The Pennsylvania Railroad has bought one 10-ton and two 60-ton 30-ft.-span riveting tower cranes for its Altoona shops and will buy two more shortly. The William Cramp Ship & Engine Building Co., Philadelphia, has bought a 40-ton and a 20-ton crane.

The Ordnance Department has ordered 75,000 light Browning rifles and 15,000 aviation guns from the Marlin-Rockwell Corporation, New Haven, Conn., and 101,106 water boxes from the Pfau Manufacturing Co., Cincinnati, Ohio.

The Durston Gear Corporation, manufacturer of selective type transmissions, Syracuse, N. Y., has received a contract from the Government to manufacture transmissions for motor trucks to be used in France. The company has no intention of enlarging its plant, as this work is along its regular line of production, for which it is amply equipped. The plant will be a 100 per cent Government plant by the end of this year.

The Ordnance Department, Washington, has awarded a contract to the Barney Ahlers Construction Corporation, 110 West Fortieth Street, New York, for the erection of a new gas defense plant on Governors Island.

The Continental Can Co., Syracuse, N. Y., has acquired an entire block of property bounded by Coles and Monmouth, Fifteenth and Sixteenth streets, Jersey City, N. J., for about $62,000, and will use the site for a new plant, which, it is understood, will be three and four stories, to give employment to about 400 persons and to be ready for occupancy early in 1919. The company also operates plants at Syracuse, Chicago, New York, Baltimore and Canonsburg, Pa.

The James J. Matthews Co., Paterson, N. J., has been incorporated with a capital of $25,000 to manufacture automobile parts, accessories, etc. James J. Matthews, George K. Slingland, Paterson, and Robert J. Stell, Pompton Plains, are the incorporators.

The Ambursen Construction Co., 61 Broadway, New York, has established a shipyard at Little Ferry, near Hackensack, N. J., for the manufacture of concrete vessels for the Government.

The Rare Metal Products Co., 726 Bloomfield Avenue, Glen Ridge, N. J., has increased its capital from $50,000 to $180,000. The company recently acquired a plant on Cortland Street, Belleville, N. J.

Franklin Williams, Newark, N. J., is having plans prepared for a one-story foundry, 50 x 150 ft., to be erected at Jefferson and Oliver streets, and devoted to light foundry work. Marshall N. Shoemaker, 207 Market Street, is architect.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for a forge and blacksmith shop, coppersmith works and electrical shop at Cape May, N. J. It is also having plans drawn for the proposed naval base, with aviation station, shops, etc., at Phillipsburg, N. J., to cost about $10,000,000, and for a similar base at Stewartsville, N. J.

The shell-loading works to be erected by the Ordnance Department, Washington, at Morgan, N. J., to replace the structures recently destroyed by explosion and fire, is estimated to cost $6,000,000, with preliminary estimates placed as high as $10,000,000. It will be reconstructed and operated by the T. A. Gillespie Co., 50 Church Street, New York. The explosion caused a loss of 325 out of 700 structures, with 12 out of 13 complete units for shell loading. The works had a capacity of about 50,000 loaded shells per day. In the reconstruction. It is understood that this capacity will be increased, and for such purpose an additional 2800 acres has been purchased, allowing also for placing individual units further apart. The new buildings will be one story, averaging 75 x 200 ft.

The National Clutch Co., 544 West Twenty-seventh Street, New York, has acquired the plant of the Empire Metal Products Co., Irvington, N. Y., which has been held at about $200,000. It comprises a three-story brick and concrete building, on a tract of 2½ acres.

Fire Oct. 5 destroyed a portion of the metal-working plant of Burdick & Son, Hamilton and Mosher streets, Albany, N. Y., with loss estimated at $50,000.

The extension to the plant of the Oxweld Acetylene Co., 640 Frelinghuysen Avenue, Newark, N. J., will be three stories, 42 x 100 ft., estimated to cost $50,000.

Gorka & Lorenz, 67 Hamilton Street, Newark, N. J., have organized to manufacture tools. W. Gorka and Charles Lorenz head the company.

Buffalo

BUFFALO, Oct. 14.

The American Car & Foundry Co., 370 Babcock Street, Buffalo, will build a new punch shop.

The Lumen Bearing Co., 197 Lathrop Street, Buffalo, is building a new one-story foundry, 60 x 100 ft., to cost $15,000.

The American Ship Building Co., Cleveland, is operating a plant at Buffalo for the construction of steel freighters of from 3000 to 4000 tons capacity. The plant is giving employment to about 1800 men, and four vessels are under construction.

The Pierce Arrow Motor Car Co., Buffalo, has completed plans for the construction of a testing works, reassembling plant and boiler house on the Niagara River Road, Tonawanda. It is understood that other buildings will be erected later.

The Water Commission, Lockport, N. Y., is planning for the installation of new pumping machinery at its waterworks at North Tonawanda to increase the capacity about 3,000,000 gal.

The Pittsburgh, Shawmut & Northern Railroad, Boliver, N. Y., is planning to rebuild and enlarge its local railroad shops.

The New York Central Railroad, Grand Central Terminal, New York, has awarded a contract to the R. W. Smith Corporation, 30 Church Street, New York, for the construction of four one-story buildings, about 30 x 60 ft., and 30 x 40 ft., at its shops at De Witt, N. Y.

The Rochester Can Co., Rochester, N. Y., W. E. Gray, president, will build a one-story top addition, 156 x 210 ft., to its factory on Hague Street.

The Brown Folding Machine Co., Erie, Pa., has taken out a permit for a one-story concrete block factory building, 100 x 140 ft., to be erected at Eighteenth Street and American Avenue at a cost of $25,000.

The Buffalo Housewrecking & Salvage Co., Buffalo, is in the market for a 15-ton electric crane; also for 100 tons of structural steel for a crane runway at its plant at Sycamore Street and the Erie Railroad, Buffalo.

New England

BOSTON, Oct. 14.

Machine tool builders report an increase in orders for the week. Added to the real shortage of labor, the inroads of influenza on the working force have had a marked effect on production as in many shops at least one operative in five has been ill. In other respects the condition of business is little changed.

The New Britain Machine Co., New Britain, Conn., has issued additional shares of stock of the value of $250,000. This makes the outstanding capital $1,500,000.

The Sleeper & Hartley Co., Worcester, Mass., has awarded to the E. J. Cross Co. a contract for a factory, 60 x 200 ft., one story, on Chandler Street.

The Pratt & Whitney Co., Hartford, Conn., has awarded a contract to R. G. Bent & Co., for a foundry addition, 50 x 120 ft., one story.

The Paterson Forge Co., Bridgeport, Conn., has been incorporated with authorized capital stock of $50,000 to manufacture forgings and machinery. The incorporators are James Paterson, Stratford; Walter Paterson and Harold Paterson.

The M. P. Brundige Co., Inc., Boston, Mass., has been incorporated with authorized capital stock of $25,000. M. P. Brundige is president and James W. Damerall, Jr., 147 Pearl Street, treasurer.

Philadelphia

PHILADELPHIA, Oct. 14.

The McFarland-Meade Co., Forty-sixth Street and Woodland Avenue, Philadelphia, manufacturer of metal windows, etc., is taking bids for a one-story addition, 120 x 140 ft., at Seventy-first Street and Kingsessing Avenue, to cost $35,000.

The Simplex Valve & Meter Co., 625 Wood Street, Philadelphia, has had plans prepared for a one-story brick plant, 76 x 150 ft., at Blenheim, N. J.

The American Insulation Co., Roberts and Stokley avenues, Philadelphia, is having plans prepared for an addition on property adjoining its works. The extension will comprise a one and two-story factory and power plant for works operation, as well as an office building, to release, it is understood, present office quarters for other service. The construction is estimated to cost $200,000.

The Tacony Ordnance Co., Milnor and Bleigh streets, Philadelphia, has broken ground for a two-story addition, 45 x 49 ft.

The Bureau of Yards and Docks, Navy Department, Washington, is having plans prepared for a pattern shop at the League Island Navy Yard, Philadelphia, to cost, with equipment, over $500,000. Contract has been awarded to the J. S. Rogers Co., Drexel Building, for the construction of four one-story buildings, 60 x 250 ft., at Fort Mifflin, near Philadelphia, to cost about $140,000. A one-story pumping plant will also be erected at this point.

The Standard Engineering Co., Philadelphia, has been incorporated with capital of $75,000 by Edward H. Rouss, Jr., Joseph F. X. Rouss and James L. Webber, to manufacture pipe, fittings, etc.

The Barrett Mfg. Co., Bermuda and Margaret streets, Philadelphia, will commence the erection of a one-story boiler plant, 60 x 84 ft., to cost $50,000.

The H. Belfield Co., 435 North Broad Street, Philadelphia, manufacturer of steam fittings, etc., has taken title to the five-story, three-story and one-story factory buildings at Broad and Hamilton streets, on property 95 x 210 ft., for a consideration said to be about $385,000.

The Main Belting Co., 1219 Carpenter Street, Philadelphia, has increased its capital from $100,000 to $1,300,000.

The Bridgman Brothers Co., 131 South Thirty-first Street, Philadelphia, manufacturer of steam fitters' supplies, etc., has filed plans for a one-story brick addition, 17 x 128 ft.

The School of Industrial Arts, West State and Willow streets, Trenton, N. J., has commenced the erection of a two-story industrial school on Quarry Street, 56 x 65 ft. The school will be devoted to machine shop and wood-working, as well as clay-working and ceramic instruction. On the first floor a machine shop, 21 x 86 ft., will be provided, equipped with new machine tools and small tools to cost about $10,000. The present equipment now in service at the existing school will be removed to the new location. A toolroom, 21 x 48 ft., will adjoin the machine shop, while a wood-working shop, 21 x 86 ft., will be located over the machine shop. In the basement an automobile engine laboratory will be established. Frank Frederick is director.

Stapler & Boll, Mears Building, Scranton, Pa., are planning the construction of a coal breaker and stripping plant at West Nanticoke, to cost $100,000. Frank B. Davenport, Coal Exchange Building, Wilkes-Barre, is engineer.

The Ordnance Department, Washington, is planning the construction of a hydroplane station and plant at Essington, Pa., to cost $400,000. Gen. R. C. Marshall, Jr., Construction Division, is in charge.

A one-story boiler plant to cost $50,000 will be erected by the Armour Leather Co., Chicago, Ill., affiliated with Armour & Co. Westinghouse Church Kerr & Co., 37 Wall Street, New York, are the engineers.

The War Department, Washington, has arranged for the construction of two plants for the manufacture of sulphuric acid for the Army, to be located at Emporium and Mount Union, Pa. The first noted, of eight units, to be located on Driftwood Creek near the Emporium Iron Co., calls for a 1000-kw. power plant and is estimated to cost $2,000,000. The plant at Mount Union will cost approximately $1,000,000. A 20-acre site has been acquired near the Aetna Explosive Co. The Leonard Construction Co., 17 Battery Place, New York, has received the contract for erection.

The Cornwall Railroad Co., Lebanon, Pa., will build a one-story addition to its engine house at West Lebanon, 68 x 70 ft., to cost $10,000.

The Bethlehem Motors Corporation, Allentown, Pa., has received a contract from the War Department for 1500 class B Liberty motor trucks, totaling about $6,000,000. The company has so far built over 1200 trucks for the Government. Employment is now given to 450 men, and this number will be increased.

The Penn Trojan Powder Co., Allentown, Pa., has recently commenced the operation of a shell-loading department at its works near Jordan Bridge, and is now giving employment to about 900 persons.

The Philadelphia & Reading Railway has awarded contract for a new engine house and shop at Rutherford, Pa., to A. L. Carhart, Philadelphia. The building will be a one-story, 114 x 132 ft., and cost about $100,000.

The Downingtown Iron Works, Downingtown, Pa., has increased its capital stock from $12,000 to $150,000.

Baltimore

BALTIMORE, Oct. 14.

The Bartlett Hayward Co., Scott and McHenry streets, Baltimore, will build a one-story tool building, 100 x 105 ft., at Columbia Avenue and Putnam Street. Morrow Brothers, Fidelity Building are the building contractors.

The Union Shipbuilding Co. Fairfield, Md., has awarded contract to the Hughes Foulkrod Co., Commonwealth Building, Philadelphia, Pa., for a one-story addition to cost $150,000. It is also having plans prepared for a 700-ft. pier.

Thomas H. Mitchell, Salisbury, Md., is planning to rebuild his wood-working plant recently destroyed by fire with loss of about $25,000.

In connection with its plant to be located at Cumberland, Md., at a cost of about $5,000,000, the American Cellulose & Chemical Co., 613 Fifth Avenue, New York, will purchase machinery and tools to the extent of about $3,000,000. The George A. Fuller Co., Munsey Building, Washington, has the contract for erection.

The Crescent Auto Machine Works, Wilmington, Del., has been incorporated with a capital of $10,000 by George G. Steigler and J. H. Dowdell.

T. H. Aldrich, regional adviser, resources and conversion section, War Industries Board, Birmingham, Ala., has issued an announcement that the Government is desirous of placing orders for 3-in. shells with local or neighboring plants equipped for production at the rate of 80,000 shells per day.

M. V. Beason, 120 South Twenty-second Street, Birmingham, Ala., is contemplating the establishment of a plant for the manufacture of surgical and other instruments.

The Bureau of Yards and Docks is planning for the construction of four new buildings at the naval air station and works at Key West, Fla., to cost $77,000.

Chicago

CHICAGO, Oct. 14.

While there is nothing individually of a huge character before the trade at this time, the aggregate of miscellaneous inquiry and the attempt to handle it constitutes a rush. The great difficulty is getting tools to deliver, and the worst of this is that no betterment is in sight. It is not doubted that the semi-steel shell program will call for a great number of machines which will be wanted as soon as the Ordnance Department arrives at and announces its plan of procedure for manufacturing the shells. A series of operations has been worked out, their time determined, also the costs of producing shells in lots of various size determined, but this will not be given publicity until the best methods of molding and casting the shells is finally settled. Meetings to be held in the coming week at Washington probably will determine this. The one fear is that tools cannot be obtained from regular sources. A representative of the plant division, Production Department, Ordnance Department, is authority for the statement that if this exigency occurs drawings will be distributed and the necessary tools will be made in plants not now making machine tools. The gist of the matter is that the tools must be had somehow.

It is understood that while the Government will advance no financial assistance for the molding of semi-steel shells, it will help those foundries which have floor space and will install a machining plant for the completion of the shells which are cast.

The current talk of peace is having no tendency to curtail the demand for tools needed in war work. Several local machinery men spent the week, or a part of it, in Milwaukee at the exposition of foundry and metal-working machinery and equipment conducted by the American Foundrymen's Association in connection with its convention.

A general contract has been awarded to the Schmidt Brothers Construction Co., 74 West Washington Street, Chicago, for the first unit of a factory to manufacture belts for soldiers, sailors and machine guns in North Racine Avenue, near Clybourne Avenue, for the Phoenix Trimming Co., 2008 North Racine Avenue. The first unit will be two stories, 62 x 111 ft., and cost over $50,000.

Sub-contracts for several building projects, which have been mentioned from time to time, continue to be placed, showing that the contemplated construction has been approved by the Illinois State Council of Defense, which must pass on all building projects to determine their essential character.

Robert T. Newberry, 108 South La Salle Street, Chicago, has taken preliminary bids, and will take final bids when the plans have been approved by the War Industries Board for a one-story factory, 100 x 100 ft., at Kedzie Avenue and Thirty-first Street, for the D. H. Stewart Co., to cost $25,000.

The United States Government, represented by the Symington-Chicago Corporation, has been granted additional permits for the construction at the Symington plant, Chicago, of several additional building units to cost $120,000. The new plant at Seventy-fourth Street is well under way. Roofing is being placed and machinery installed.

The American Steel & Machinery Co., Kensington, near Chicago, is adding to its shell plant, which, when completed, will have a capacity of 6000 per day.

The Decatur Bridge Co., Decatur, Ill., has started work on improvements to its plant, including an addition to its machine shop and the reconstruction of its old machine shop at a cost of $12,500.

The H. W. Clark Co., manufacturer of meter boxes and water works appliances, Mattoon, Ill., is rebuilding its plant and is in the market for foundry equipment of special construction and special machine-shop tools and equipment. Purchases are now being made and are to be completed within 30 days. Horace W. Clark is president.

The Kelley-How-Thomson Co., wholesale hardware dealer, Duluth, Minn., is in the market for 36-in. and 60-in. graduated circumference wheels for shipwork and mold loft work.

The Pennsylvania Railroad, Chicago, is having plans prepared for the construction of a one-story addition to its shops, 50 x 70 ft., at Fourteenth Street and the Canal, to cost about $30,000.

The Holt Mfg. Co., Peoria, Ill., manufacturer of tractors, agricultural machinery, etc., has arranged with the War

Department for the construction of several additions to its works at East Peoria, to cost about $3,000,000. The structures will consist of five new machine buildings and shops for general manufacturing, three assembling and erecting buildings, and an extension to the boiler plant. V. Jobst & Sons, Lehman, Peoria, have the contract.

Deere & Co., Moline, Ill., manufacturers of agricultural equipment, are building an addition to their works at East Moline to cost about $300,000.

The United States Ball Bearing Co., 4535 Palmer Street, Chicago, has awarded a contract to S. Swerberg, 6338 Magnolia Avenue, for a one-story addition, 80 x 84 ft., to cost $13,000.

John Kausel, 1859 East Twenty-eighth Street, Minneapolis, Minn., has plans for the erection of a one-story addition to his foundry, 48 x 68 ft.

The State Board of Control, State House, St. Paul, Minn., is planning for the construction of a new power plant at Rochester, Minn.

The Empire Machine Works, Terre Haute, Ind., which succeeded the defunct Wabash Gear Works, has Government contracts for machine gun parts.

Milwaukee

MILWAUKEE, Oct. 14.

The demand for milling machines the first two weeks of October has been the heaviest for a similar period in several months. Several large lots were placed the past week by makers of 8 and 12-cylinder aircraft engines in the Central States, the requirements being for the heavier types of millers and divided into quantities as large as 30 machines. In addition, there has been quite an exceptional demand for single tools and smaller lots from shops in the East and Middle West. Local milling machine manufacturers are quoting on an average of three and one-half to four months' delivery, which is a considerable improvement over a year ago, when deliveries were extended eight to nine months.

It is reported that the Manitowoc Shipbuilding Co., Manitowoc, Wis., will add a complete foundry unit to its plant at an estimated cost of $150,000, to avoid delays encountered in obtaining adequate supplies of castings under the contract system. As noted, the company recently acquired 750 ft. of additional dock frontage from the Burger Boat Co., and will build a new fabricating shop, 60 x 300 ft., and a paint shop, 40 x 50 ft. Details of the proposed foundry project are not yet available. L. E. Geer is general superintendent.

The Galland-Henning Mfg. Co., Milwaukee, manufacturer of pneumatic malting machinery, baling presses and other hydraulic equipment, will build a one-story machine shop addition, 60 x 150 ft., for essential war work, at its plant on Twenty-sixth Avenue. It will be of reinforced concrete, brick and steel and contain a crane runway. The cost is estimated at $25,000 without equipment. C. L. Van Ess is vice-president and general manager.

The International Steel Products Co., Milwaukee, has awarded contracts for the erection of its new plant at Hartford, Wis., which will be 68 x 125 ft., two stories and part basement, of brick and mill construction, and cost about $35,000 with equipment. The company specializes in the manufacture of a silencing device for motor vehicles and gas engines. Otto C. Unke, 1054 Third Street, Milwaukee, is vice-president and manager.

The General Tool & Mfg. Co., 380 Fourth Street, Milwaukee, has increased its capital stock from $15,000 to $25,000 to accommodate the expansion of its business. It manufactures tools, dies and other machine shop specialties.

The Universal Cement Mold Co., Fond du Lac, Wis., has moved its offices and headquarters to 707 Merrill Building, Milwaukee, and intends to establish permanent works in North Milwaukee. Details of the project have not been announced, but the initial work will cost about $25,000. A. S. Greene is secretary.

Langenbach Brothers, machinists, Kenosha, Wis., have disposed of their shop and business to Fritz Rudy, who will continue the plant at Park and Exchange streets and make a specialty of machinery repairs, welding and cutting processes.

The Chicago & North-Western Railroad Co., Chicago, has awarded a contract to L. O. Peppard, 1712 Irving Avenue Minneapolis, Minn., for the erection of a roundhouse and repair shop addition and new tool sheds at the terminal in Ashland, Wis.

The Lighthouse Superintendent, 424 Government Building, Milwaukee, is taking bids until Oct. 19 for two 15 to 20-hp. oil engines.

The Kahlenberg Brothers Co., Two Rivers, Wis., manufacturer of marine and stationary oil engines, is enlarging its works by the addition of a new testing and shipping room, to be equipped with a 5-ton electric traveling crane and other appliances. The space now used for testing and shipping will be converted into a machine shop addition.

The Walter Engineering Co., Kenosha, Wis., has been incorporated with a capital stock of $25,000 by Ferdinand C., E. M. and A. H. Walter, who have been conducting a general engineering works at Winthrop Harbor, Ill. The new corporation will erect a shop in Kenosha, to be ready about Dec. 1. The investment will be about $20,000.

The Falls Motors Corporation, Sheboygan Falls, Wis., manufacturer of gasoline engines, has awarded a contract to the Immel Construction Co., Fond du Lac, Wis., for the erection of a one-story addition, 120 x 272 ft., of brick and mill construction, to provide additional capacity to fill Government contracts. A. C. Clas is secretary and treasurer.

The Langstadt-Meyer Co., Appleton, Wis., manufacturer of electrical appliances, farm lighting systems, etc., has leased the building until now occupied by the Appleton Motor Car Co., and will install new equipment for the production of direct-connected generating units for shop and farm purposes.

The Hunt Boiler Works, Marinette, Wis., has added a night shift to handle boiler and tank work and engine repairs on Government account. A small amount of new equipment is being installed. Lawrence Hunt, Sr., is general manager.

The Marathon Electric Mfg. Co., Wausau, Wis., manufacturer of small motors and motor-driven devices and appliances, is erecting a two-story shop addition, 45 x 65 ft., to its plant on Stewart Island. The company has sufficient orders to keep it busy at maximum capacity for 12 months.

The Northern Foundry Co., Marinette, Wis., is making extensions and improvements costing about $25,000, which are expected to be completed by Dec. 1, and will permit an increase of capacity from 50 to 60 per cent. The company has acquired the foundry and machine shop of the former Marinette Iron Works, and is converting the building into a foundry addition, to contain two new cupolas. An extension, 20 x 50 ft., will give the main foundry a length of 370 ft., and provide a continuous building 418 ft. long. A wing is used as an office and pattern shop.

The Manistique Pulp & Paper Co., Manistique, Mich., will invest more than $500,000 in the construction and equipment of additions to be erected by day labor under the direction of H. J. Storer, consulting engineer.

Detroit

DETROIT, Oct. 14.

Munition making completely dominates the industrial production and the machinery market in this district. Slightly over 90 per cent of all manufacturers are working on war orders, with an average of 75 per cent of their plants engaged on Government work. Although additions in plant facilities are discouraged by the War Industries Board, large orders for machinery for war work are being placed.

The Industrial Works, Bay City, has received an additional order for giant cranes, and is far behind in its production.

Among Michigan concerns to receive Government orders are the following: Ford Motor Co., Detroit, ambulances, test tools and helmets; Industrial Works, Bay City, locomotive cranes; American Brass Goods Co., Grand Rapids, inspection gages; Albion Malleable Iron Co., Albion, shrapnel heads; Lansing Co., Lansing, dock trucks; Detroit Copper & Brass Rolling Mills, Detroit, cartridge-case disks; Champion Ignition Co., Flint, spark plugs; Grand Rapids Brass Co., Grand Rapids, time fuse pins; Keeler Brass Co., Grand Rapids, oiler and thong cases; Mallometer Co., Detroit, inspection gages; Wilcox Motor & Mfg. Co., Saginaw, adapters and shell assembly; H. E. Sherman Mfg. Co., Battle Creek, fire hose nozzles; Clipper Belt Lacer Co., Grand Rapids, belt lacers and hooks.

The Studebaker Corporation, Detroit and South Bend, Ind., has a large contract for field guns, to be manufactured at both plants.

The Buick Motor Co., Flint, Mich., and the Lincoln Motor Co., Detroit, will turn out several thousand Liberty motors for a recent Government order, the Buick company to make the 8-cylinder type, and the Lincoln company the 12-cylinder.

The Liberty Motor Car Co., Detroit, was recently awarded a contract for 2500 trailers, similar to those being turned out by the Paige Detroit Motor Car Co.

The Ford Motor Car Co., Detroit, is purchasing more machinery in connection with building 10,000 small tanks.

The Continental Motors Corporation, Detroit, has been buying more machine tools for its plants in Detroit and Muskegon. It will probably make no more passenger car motors after Jan. 1 except for Government use.

The Wilson Foundry & Machine Co., Pontiac, Mich., recently contracted to turn out motor truck engines from all rejected Liberty motor parts.

The Hudson Motor Car Co., Detroit, will erect an additional plant, 60 x 460 ft., to cost approximately $60,000. It is reported that the building will be used for making shells.

The Liberty Motor Car Co., Detroit, is reported to be inquiring for a number of lathes, drills and planers, totaling about 70 machines.

The J. M. Case Trailer Co., Grand Rapids, Mich., is a new company, manufacturing a complete line of all-steel semi and four-wheeled trailers of 3, 4, 6 and 10-ton capacity. It also builds three sizes of pole trailers, and trailer chasses equipped with gravity steel dump bodies. J. M. Case is president.

The Wolverine Tractor Co., Saginaw, Mich., which recently removed from Detroit, will begin operations in a few days. W. G. Wagenhals is secretary and manager.

The Dafoe Shipbuilding Co., Bay City, Mich., has started foundation work on its buildings for constructing the keels of the steel tugs it is to build for the Government. The main building will be 60 x 200 ft. and several smaller structures will be erected.

The D'Arcy Spring Co., Kalamazoo, Mich., is engaged almost exclusively on war work, having large contracts to make springs for Colt revolvers, Browning machine guns, ambulances and motorcycle side cars.

The Burroughs Adding Machine Co., Detroit, which is erecting a four-story factory building, has received a contract which, it is stated, calls for a daily output of 2800 automatic pistols. New equipment will cost several hundred thousand dollars.

The Dachel-Carter Boat Co., Benton Harbor, Mich., has received a Government order for five ocean-going steam tugs, which makes it necessary to increase production facilities, and the working force by 200 additional men.

The Detroit Auto Piston Co., Detroit, Mich., is taking bids for the construction of a one-story building, 60 x 100 ft., on Baltimore Avenue, near Greenwood Street, to cost about $12,000.

The Aluminum Castings Co., Joseph Campau Avenue, Detroit, is having plans prepared for an addition to its plant to cost about $150,000.

The Packard Motor Car Co., Detroit, is having plans prepared for a one-story extension to its enameling department, 150 x 200 ft., at Harper and Strong Avenues, to cost about $75,000.

Cincinnati

CINCINNATI, Oct. 14.

A large number of portable electric grinding machines have recently been ordered from local firms by airplane manufacturers.

As far as is known no orders have been placed on the tentative inquiry recently sent out by the Ordnance Department for 4000 20 and 24-in. lathes. There is a very urgent demand for large milling machines, and different types of grinding machines are also wanted. It is impossible to make prompt shipment of large lathes and planing machines. The call for shaping machines is somewhat scattered, but is improving, and manufacturers have work enough in hand to keep them busy for several months.

A call for 3000 workmen for building the air nitrates plant at Ancor has tended to still further reduce the supply of common labor. Manufacturers are co-operating with the Government in obtaining these men and are replacing them with women in all departments where it is possible. The shortage of both common and skilled labor at Hamilton, Ohio, is probably more acute than in Cincinnati.

The French Government, through agents, has been buying some machine tools, and orders for 26 lathes were placed with the Rahn-Larmon Machine Tool Co. It is rumored that other machine tools are also wanted.

The Stuebing Truck Co., Cincinnati, maker of lift trucks, has acquired a factory at Mitchell Avenue and the Big Four Railroad, and will remove its truck-making department from Walnut Street as soon as the new factory can be fitted up. Machinery will be installed in the new plant to enable it to more than triple its present output. Several machine tools, including lathes, milling machines, shapers and drill presses will be needed. The company's business offices will remain at 221 West Third Street.

The Hisey-Wolf Machine Co., Cincinnati, has taken out a permit for an addition to its plant on Colerain Avenue, estimated to cost $15,000. This building will be used mostly for storage purposes.

The Hooven, Owens Rentschler Co., Hamilton, Ohio, has let contract for an addition to its foundry, as well as a crane yard.

The new wood-working machinery plant of the Bentel & Margedant Co., Hamilton, Ohio, has been completed and practically all the machinery installed.

The Niles Tool Works Co., Hamilton, Ohio, expects to occupy its new office building before Dec. 1. The removal of its offices from the main plant will enable the space to be used for manufacturing purposes.

The Dayton Castings Co., Dayton, Ohio, has purchased the former plant of the Craig-Reynolds Foundry Co., on Chapel Street, and will remodel it at an early date. The company recently increased its capital stock from $50,000 to $100,000.

The Duriron Castings Co., Dayton, will build an addition to its plant, 100 x 500 ft., one story, of reinforced concrete.

It is reported that the Dayton Wire Wheel Co., Dayton, will add some equipment to its plant to take care of a recently acquired Government contract.

The Central South

LOUISVILLE, Oct. 14.

Local boiler and machine shops are busy and have enough orders booked to keep operating for several months.

The Chattanooga Iron & Coal Corporation will immediately rebuild the part of its plant recently destroyed by fire.

The Memphis Coal Mining Co., with properties at Mannington, Ky., will erect a power house and two electrically equipped coal tipples. It plans to install a number of large motors.

The Pike Coal Co., Petersburg, Ind., will rebuild its coal tipple and replace the machinery recently destroyed by fire.

A power plant is to be installed by the Eastern Kentucky Service Co., incorporated with $5,000 by W. S. Wells and others.

The Nashville Bridge Co., Nashville, Tenn., is in the market for a 10-ton electric crane, 60 ft. span; a punch with 36 in. or 42 in. throat, to punch 1-in. hole in 1-in. material; also a bulldozer.

Pulverizing machinery will be installed by the Mineral Pulverizing Co., Wheeling, W. Va., which has been incorporated with a capital of $25,000 by S. J. Windson and others.

The New River Co., Mount Hope, W. Va., plans the erection of machine shops and a warehouse to cost $75,000 or $100,000.

The Willard Machine Tool Co., Covington, Ky., is having plans prepared by C. C. & E. A. Weber, Cincinnati, Ohio, for a frame addition to its machine shop, 60 x 140 ft., to cost $15,000.

The Lucey Foundry & Machine Co., Chattanooga, Tenn., recently incorporated with a capital of $300,000, is said to be planning for extensions in its plant.

Pittsburgh

PITTSBURGH, Oct. 14.

The principal business in the local machinery market comes from the Ordnance Department, United States Steel Corporation, which is placing many orders for the Neville Island gun and projectile plant. Orders for ladle cranes have been placed with the two largest builders of this type, and it is expected that orders for the 200 or more smaller cranes will be distributed among practically all of the makers.

No contracts for semi-steel shells have yet been placed in this district so far as the machinery trade has learned. A committee of manufacturers, of which George L. Brown, Marshall Foundry Co., Pittsburgh, is chairman, has the matter in charge. Other members of the committee are William C. Rice, Pittsburgh Iron & Steel Foundries Co., Midland, Pa.; Charles J. Mesta, Mesta Machine Co., Pittsburgh; W. H. Hamilton, Rosedale Foundry & Machine Co., Pittsburgh; J. A. Katzenmeyer, Standard Engineering Co., Ellwood City, Pa.

Of the 30,000,000 semi-steel shells which the Ordnance Department requires, 24,000,000 will be of 6-in. and 8-in. sizes and 6,000,000 of 4.7-in. The 6-in. and 8-in. will be completely machined, and the 4.7-in. only partially machined. For an output of 250 6-in. shells per day of 20 hr. work, it has been estimated that 22 machining tools and a toolroom equipment of 10 machines will be required. Many

of the shops which will take on the work are already fairly well equipped. The machines needed for the work include cutting-off machines, turret lathes, grinders, engine lathes, facing machines, thread millers, etc.

Railroad shop improvements and extensions to cost about $2,000,000 will be made by the Railroad Administration, Washington, at Grafton and Fairmont, W. Va., covering the lines of the Baltimore & Ohio Railroad, the West Virginia Northern Railroad and the Monongahela River Railroad. The work will include car repair shops, engine houses, new turntables, extensions to sidings, yard improvements and other work, including housing facilities for employees. Federal manager Arthur W. Thompson and assistant manager E. E. Hamilton are in charge of the work.

The New River Co., Mount Hope, W. Va., is considering the construction of a new machine shop to cost $50,000.

The powder works now being constructed by the Government at Nitro, W. Va., is about 80 per cent completed, and it is planned to have the plant ready for operation the early part of next year. It will be one of the largest plants of its kind in the world and is expected to develop a total production of about 600,000 lb. of powder per day. The plant covers a territory about 4 miles long and 1 mile wide. About 12,000 men are now engaged in building it and a call for 6000 additional men has recently been issued to insure completion Jan. 1. The works will represent an investment of close to $50,000,000.

The Virginia Railway & Power Co., Norfolk, Va., is planning to install two more boilers at its power plant.

The Oil City Wood Working Machinery Co., Oil City, Pa., has increased its capital from $40,000 to $1,000,000.

The Pittsburgh Crane & Equipment Co., Pittsburgh, is building a two-story machine shop on Nineteenth Street, Sharpsburg, to cost $20,000.

The Outage Gauge Co., Pittsburgh, manufacturer of gages, has increased its capital from $6,000 to $50,000.

The Pearson Mfg. Co., 800 Beaver Avenue, Northside, Pittsburgh, is operating its plant at 100 per cent for the production of shaft guards and other specialties for the Government. It is also engaging in boiler work and the manufacture of marine products for the Emergency Fleet Corporation. C. C. Kleinsmith is president.

The McDonald Storage Battery Co., Clarksburg, W. Va., has been incorporated with a capital of $10,000 by M. E. McDonald, Frank C. Welch and John F. Kearns, to manufacture storage batteries.

The Victor Valve Co., Herndon, Va., has been incorporated with a capital of $50,000 by Fred C. Stelzer, Frank Hutchinson and others.

The Northern Alkali & Chemical Co., Huntington, W. Va., recently incorporated with a capital of $60,000, is planning the establishment of a plant for the manufacture of potash, etc. A building has been leased to serve as the initial works, and a machinery and equipment installation will be made to provide a capacity of about 1000 lb. a day.

St. Louis

ST. LOUIS, Oct. 14.

The Howe-McCurtain Coal Co., Howe, Okla., will enlarge its coal and washer plant and its oven capacity.

The Cherokee Gin Co., Biggers, Ark., S. E. Harrison, president, will purchase about $12,000 worth of new machinery.

Howe, Okla., has appropriated $5,000 for electric light plant machinery and is receiving bids therefor.

Stillwater, Okla., will install electric light plant machinery including one 250 k.v.a. 2300 volt, three-phase cycle generator, 300-hp. boiler, and other machinery.

The Crescent Stock Yard & Slaughter House Co., New Orleans, will rebuild its machine shop, recently destroyed by fire also two cooling plants and will require refrigerating equipment.

The Choctaw Refining Co., Ardmore, Okla., will install presses and other equipment for the manufacture of asphalt paving brick.

The Independence Airless Tire & Rubber Co., Independence, Mo., Eben Miller and others interested, will equip a plant for the manufacture of airless inner tubes, etc.

The A. E. Kull Tractor Co., 418 American National Bank Building, Oklahoma City, Okla., will establish a plant to manufacture tractors.

The estate of R. G. Holzer, 317 Burgundy Street, New Orleans, is in the market for one Niagara 407 circle A with flanging attachment, Loy-Nawrath draw bench, Quick Work rotary shear and flanging attachment, Ohl draw bench and other equipment.

Cleveland

CLEVELAND, Oct. 14.

Machinery builders and dealers continue to do a large volume of business although buying as a rule is not in such large lots as recently. Many orders came out the past week for lots ranging from one to a half dozen machines from truck builders, shell and gun manufacturers. The additional orders for trucks and parts being placed in this section will apparently require considerable additional machinery. The Willys-Overland Co., Toledo, Ohio, which has been buying a large amount of euipment for Liberty motor work, placed additional orders the past week for 30 to 40 small lathes. The Pennsylvania Railroad, which recently issued a list of about 75 machines mostly for Ohio shops, is placing orders against this list. The American Brake Shoe & Foundry Co., Erie, Pa., is still buying equipment, having purchased a number of lathes the past week. This company is understood to have sublet the contract for breach blocks for 6-in. guns to several other plants. The Erie Metal Products Co. is inquiring for three heavy duty drilling machines.

The demand for turret lathes and screw machines in lots of one to three is unusually heavy. Many plants including jobbing shops and stove manufacturers that have not already gone into Government work are figuring on war orders and will need additional equipment when they become engaged on work different from that which they have been doing. Cleveland machinery houses with branches in Detroit report a very active demand in that city, a number of automobile companies working entirely on Government work being in the market.

It is expected that an order will be placed shortly for a large coal handling plant for the United States Steel Corporation at Neville Island.

The Cleveland Pneumatic Tool Co., Cleveland, will build another extension to its plant, 34 x 76 ft., contract for which has been let.

The Matthews Mfg. Co., Cleveland, has had plans prepared for the erection of a shipbuilding plant at Rocky River for small boats.

The Production Foundry Co., Cleveland, has been incorporated with a capital stock of $25,000 by B. R. Morgan and others.

The Draper Mfg. Co., Cleveland, has placed contracts for an addition, 60 x108 ft., and a storage building, 34 x 110 ft. It manufactures pressed steel barrels.

The Anthony Carlin Rivet Works, East Seventy-fifth Street and Grand Avenue, Cleveland, has placed a contract for the erection of a one-story factory, 36 x 69 ft.

The Ohio Blower Co., Cleveland, will enlarge its plant by the erection of a one-story building, 120 x 160 ft.

The American Multigraph Co., Cleveland, has acquired the local assembling plant of the Ford Motor Co. to enlarge its facilities for shell work for the Government.

The Fulton Foundry & Machine Co., Cleveland, has purchased a 6-acre site along the Nickel Plate Railroad, in the eastern section of the city, for future extensions.

The following contracts for factory buildings have recently been taken by the Austin Co., Cleveland: Building with 25,500 sq. ft. of floor space, Dayton-Wright Airplane Co., Dayton, Ohio; 90 x 100 ft., Chuse Engine & Mfg. Co., Mattoon, Ill.; 110 x 100 ft., Bay City Foundry Co., Bay City, Mich.; 80 x 80 ft., Ingersoll-Rand Co., Phillipsburg, N. J.; 80 x 90 ft., North American Motors Co., Pottstown, Pa.

The Elliott Electric Co., Cleveland, has removed from 322-328 Champlain Avenue to 813-815 Superior Avenue, N. W., where it occupies a five-story and basement structure. The company does a business in electrical jobbing, motor sales and repairs.

The Supreme Motor Corporation, Warren, Ohio, recently organized, contemplates the erection of a plant, the first unit, 100 x 100 ft., to be built immediataely. The company was organized to manufacture motors, but for the duration of the war will devote its attention to war material. A. W. Green, Ashtabula, Ohio, is president, and C. H. Davies, Warren, vice president and general manager.

Texas

AUSTIN, Oct. 11.

The Texas & Pacific Coal Co., Thurber, has increased its capital stock from $4,000,000 to $5,000,000. It has extensive oil holdings and a number of producing wells in central western Texas, and it is reported that it plans the construction of an oil refinery at Ranger.

It is stated that the cost of constructing the 12-in. oil pipe line of the Prairie Pipe Line Co. from Ranger to Pelican Island, Galveston, a distance of 325 miles, including the

installation of five pumping stations will exceed $14,000,000. Extensive dock and terminal facilities will be built at Pelican Island. The pipe line will have a daily capacity of 60,000 bbl.

The Gulf Pipe Line Co., Port Arthur, has been authorized by the Fuel Administration to construct an 8-in. pipe line from Ranger to Fort Worth. It will have a daily capacity of 20,000 bbl.

The Miller-Link Lumber Co., Orange, has purchased the mill, timber holdings and railroad of the R. W. Weir Lumber Co., Texla, which enables it to increase its annual output to about 70,000,000,000 ft. of lumber.

Wetegrove & Co., Mercedes, are building an ice and precooling plant at a cost of about $50,000.

The National Shipbuilding Co., Orange, will install a plant at Galveston for equipping wooden ships constructed at its shipyards. More than 1000 men will be employed.

The Zimmerman Irrigated Lands Co., Grand Falls, is building a dam across the Pecos River and will install pumping equipment to irrigate 50,000 acres.

The Navy Department has awarded a contract to Horton & Horton, Houston, Tex., for the erection of a new naval air station, shops, etc., at Galveston, Tex., to cost about $3,000,000.

The Pacific Northwest

SEATTLE, Oct. 8.

According to statistics prepared by the Seattle Chamber of Commerce, fully 7500 men are urgently needed in local industries, and it is estimated that at least 14,000 will be required before Dec. 31 in industries directly or indirectly engaged in war work. The shortage is especially acute in shipyards, machine shops and foundries.

The Camas Mill & Flume Co.'s plant, Camas, Wash., was recently destroyed by fire with a loss of $10,000.

The Pacific Forging & Machinery Co., Portland, will erect a foundry, 50 x 100 ft., to cost $10,000.

The Willamette Iron & Steel Iron Works, Portland, has received contracts for 51 Scotch marine boilers at a total value of $1,120,000 to be installed in vessels under construction in Portland. The order has no bearing on an inquiry received recently for 50 boilers for vessels to be built on the Atlantic coast. The company has an additional 150 under contract.

The Broadway Investment Co., Portland, which is building airplanes, will erect an extension to its plant, 40x 125 ft.

The Specialty Foundry & Machine Works, Portland, is devoting its entire output to the construction of war materials. Iron castings for ships are manufactured and a specialty is made of engine parts.

The Florence Mill, Power & Light Co., Florence, Ore., recently incorporated with a capital stock of $30,000, is preparing plans for a sawmill.

The Rands Iron Works, Vancouver, Wash., plans the construction of a furnace room to cost about $6,000. The plant has a daily capacity of 4000 lb. of brass and bronze casting, practically all of which is used by the shipyards.

The Seattle Copper Works, Inc., Seattle, has been incorporated for $10,000 and contemplates the erection of a foundry.

The Puget Sound Sheet Metal Works, Seattle, plans the erection of a foundry and factory to cost $10,000.

The Franklin Tool Works, Seattle, will erect a heavy timbered foundry, 80 x 100 ft., to cost about $7,000.

Canada

TORONTO, Oct. 14.

During the last 12 months the Imperial Munitions Board has spent on an average of $30,000,000 a month and there is every indication that in the coming year this volume of business will not only be maintained but largely increased. In addition to its shell orders the Imperial Munitions Board has spent several million dollars on ship contracts.

There is a very strong demand for machinery in Canada. The manufacture of 155 mm. shells is taking considerable attention and bringing out a great number of inquiries for equipment. According to information from Ottawa, there will be a revival of munitions orders placed in the Dominion for the British Government, as well as for the United States. The question of prompt delivery of machine tools is seldom mentioned in negotiations, as the heavy demand makes it impossible to obtain definite assurances. Where tools are brought into Canada from the United States this is particularly emphasized and in few instances is delivery promised under six months.

The Canada Cement Co., Montreal, Que., has secured property and will commence at once the erection of a plant, to cost $1,000,000, for the manufacture of shells for the United States Government. The contract includes shells of the 9.2 and 12 in. sizes and the value of the order is more than $10,000,000.

Chambers & McKnight, 88 River Street, Toronto, are operating a brass foundry and in a short time will be equipped to handle all sizes of brass, bronze and aluminum castings.

The John Morrow Co., Ingersoll, Ont., is building a three-story addition to its twist drill factory which will double the capacity of the present plant. A one-story addition will also be added to its screw plant.

On Oct. 1 the D. MacKenzie Machinery Co., Guelph, Ont., manufacturer of machine tools, became a joint stock company. It has taken over the plant and property of the Dominion Bronze Co., Preston, Ont., where it will turn out a full line of metal-working machinery, while the Guelph plant will be devoted to the manufacture of wood-working machinery. Operations will be under the direction of D. MacKenzie, founder of the original company.

The sales and supplies departments of the Canadian General Electric Co., Toronto, are moving into their new quarters in the building which has been erected on the property adjoining its head office at King and Simcoe streets. The executive, engineering and foundry purchasing department offices will remain in the main building.

The McAvity Machine Co., Marsh Road, St. John, N. B., is rapidly developing into one of the largest enterprises of its kind in the Dominion. The 400-foot plant which was completed in such record time in 1916, has recently had a unit of similar dimensions added, which is being equipped with machinery. In addition the company has recently started the erection of another foundry near the Westmoreland Road, which when completed will represent an expenditure of $50,000. Grant & Horne, who constructed the original plant, have the contract for the later additions.

J. E. Gill, engineer, Sorel, Que., is in the market for a pump of 1,500,000 gal. capacity and one of 3,500,000 gal capacity, gasoline motor.

The Northern Bolt, Screw & Wire Co., Seventeenth Street East, Owen Sound, Ont., has commenced the erection of a two-story iron and frame factory.

The American La France Fire Engine Co., of Canada, 195 Weston Road, Toronto, is building a mill and brick addition to its plant to cost $10,000.

The mills owned by the Powell River Pulp & Paper Co., Powell River, B. C., were destroyed by fire with a loss of $40,000. The company will rebuild immediately and will require equipment.

The Tudhope Electric Metals Co., Vancouver, B. C., will start work at once on the erection of an electric foundry. The M. P. Cotton Co., False Creek, B. C., is the general contractor.

The Alaska Bedding of Montreal, Ltd., 412 St. Ambrose Street, Montreal, Que., is in the market for a punch press with 1½-in. stroke, rear drive, capacity 1-in. hole in 3/16-in. plate.

The Guarantee Liquid Measure Co. of Canada, Ltd., Kitchener, Ont., has been incorporated with a capital stock of $50,000 by Arthur V. Phillips, David S. Bowlby, Lloyd H. Phillips and others to manufacture pumps, measures, etc.

The Aircraft Mfg. Co. of Canada, Ltd., Montreal, has been incorporated with a capital stock of $525,000 by Robert C. McMichael, Daniel P. Gillmor, Gerald A. Coughlin and others to manufacture machinery, engines, motors, airplanes, etc.

The Canadian Johns-Manville Co., Ltd., Montreal, Que., has been incorporated with a capital stock of $2,500,000 by Gordon W. MacDougall, Lawrence Macfarlane, Linton H. Ballantyne and others to manufacture asbestos, metals, machinery, tools, etc.

The Electric Irons, Ltd., Orillia, Ont., has been incorporated with a capital stock of $45,000 by James B. and William H. Tudhope, Robert L. Whitman and others to manufacture machinery, boilers, electrical equipment, etc.

The Canadian Graphaphone Co., Ltd., Montreal, has been incorporated with a capital stock of $75,000 by W. Despacas, A. Cinq-Mars G. Vezina and others to manufacture talking machines, musical instruments, etc.

J. B. Bowes, Chatsworth, Ont., is in the market for a self-regulating steam air compressor, from 8 to 15 hp.

The Shortreed Lumber Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000, by John J. Gibson, Edward McLaren, Thomas A. Scanlon and others to manufacture lumber, wood products, etc.

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